INTERNATIONAL RECORD OF MEDICINE

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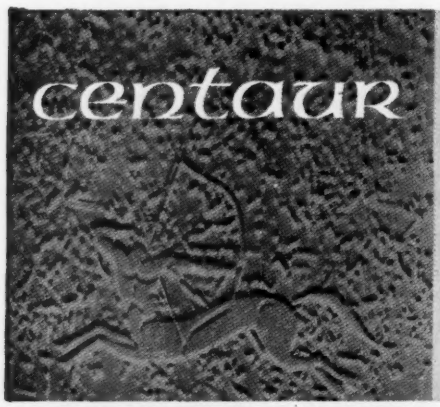

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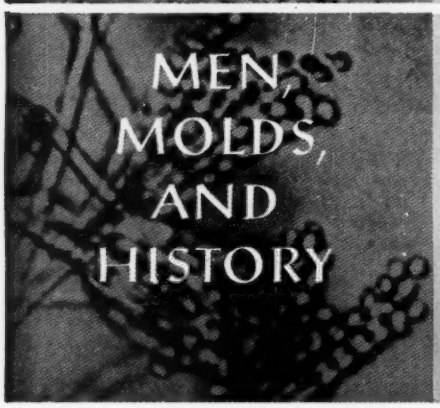

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The Impact of Nineteenth-Century Thought on Psychiatry*

Walther Riese, M.D.

MEDICAL COLLEGE OF VIRGINIA

RICHMOND, VA.

Medicine is taught in our schools as a body of knowledge and experience bearing no apparent relation to the trends of time. To the student it seems that he is dealing with a science that carries with it its own seed of development, and that must advance completely of its own accord. The past stage of that science is considered a phase of inferior, if not false, but in any case useless knowledge, and the study of medical history is regarded as entertaining rather than informative. Psychiatry is one of the newest domains of contemporary medicine. The nineteenth century witnessed its birth and growth; in this period was accomplished the work of centuries. I shall attempt to show that this development would have been impossible without the impetus given by nineteenth-century thought.

At the turn of the nineteenth century Philippe Pinel[1] stands out for his courageous and successful endeavor to give to the mentally ill the irrevocable status of patient, requiring medical care and not punishment.† Pinel won most of his fame through liberating the insane from chains. One would like to believe that the spectacle of an enchained citizen, sick or healthy, was unbearable to the son of the revolution. But his achievement remained primarily that of a true physician, finding indeed in the philosophy of the French revolution the intellectual weapons and tools suitable for his aims and necessary for his action. Pinel was a fervent adherent to unprejudiced observation and Hippocratic medicine. Before interfering with nature, the Hippocratic physician wants to listen to it and not to disturb it. One of Pinel's greatest concerns and ambitions was to study and to record the natural history of disease. It has become tradition to ascribe Pinel's reforms to his sensibility and

* Convocation lecture delivered to the Washington School of Psychiatry, Oct. 24, 1953. This paper is dedicated to the memory of Dr. Frieda Fromm-Reichmann, commemorating 40 years of uninterrupted friendship.

† William Tuke organized a similar movement in England; Vincenzo Chiarugi, in Italy. But the motivation was far from being the same in each of them. I intend to enlarge on this subject in the future.

humanitarian feelings. But his mind, trained by the humanities, was that of a scholar rather than a sentimental apologist. Nor was his love for his fellow human beings merely a spontaneous manifestation of his kind and gentle nature; it, too, was sponsored and shaped by the teaching of the philosophers of the eighteenth century. Pinel's method was analytic and experimental rather than intuitive or visionary.

Though the definition of romanticism has always been a difficult task, certain significant features may be pointed out concerning the scientific and artistic tendencies of the early nineteenth century. Above all, romanticism assumed a strongly polemic attitude toward classicism and its emphasis on general, objective, and analytic thought. To this thought romanticism opposed its well-known individualism and subjectivism, as well as a more intuitive and synthetical view of nature. Pinel was still classic in a double sense. He secured to the mentally ill the objective state of a human being endowed with rights and duties, in brief, that of a citizen. But he also was very general and analytic in his medical thought concerning the universal and anonymous equipment of the human mind. When trying to reach a diagnosis, he traced the history of human thought. "All I want to do," he said, "is to suggest to those who strive for solid knowledge that they follow the general march of reasoning." But when his pupil Jean Étienne Dominique Esquirol turned to the passions, he asserted, wittingly or not, the influence of romanticism. K. W. Ideler did the same in Germany. Not only did the psychiatrist's interest in both countries, France and Germany, shift to the subjective aspect of human existence and disease—a truly romantic shift—the very topic, namely the passions, was significantly romantic. The disordered and violent state that they convey is anticonventional and antirational, thus thoroughly romantic. With the passions entering the picture, psychiatry, for the first time, became psychological. This movement was brought to its preliminary conclusion by Moreau de Tours. Again, he selected a specifically romantic theme, namely the dream, one of the "darksome sides" of man, in which at times romanticism indulged, and which was closely linked with the unconscious, now becoming "the key to the recognition of conscious life."[13] Moreau's interest in the natural history of the genius was another legitimate offspring of romanticism, always driving at the unusual and exceptional in human existence. In his writings Moreau frequently quoted outstanding representatives of contemporary French literature, Gustave Flaubert, Théophile Gautier, Maxime du Camp, Gérard de Nerval. This school of thought was definitely historical and comparative in its approach. It is from this angle that we can understand the romantic revival of the past and the rejection of the present, and also Moreau's comparative studies of mental disease in different populations. It was left to a German psychiatrist of that period to acknowledge his debt to another significant constituent of the romantic school, namely religious thought. The latter was closely related to the historical sense and method of romanticism, its strong interest in medieval life, and the inner experience it conveyed. In fact, the religious conception of disease had a history behind it, leading from primitive and magic medicine to Philippus Aureolus Paracelsus, who in the sixteenth century revived the idea of diseases as inflictions, though he reshaped it

in the light of Christian faith. Finally, Heinroth, in the nineteenth century, went so far as to identify insanity with sin.

After the romantic movement had come to its preliminary end, medicine was rapidly shifting to natural science, a most fateful step in the history of medical thought. The psychiatrist became convinced that knowledge of diseases could not be obtained from general ideas; instead, he tried faithfully to describe the various diseases, to compare their signs, and to establish classifications.[2] In the words description and classification were embodied the rather modest aims of the new type of psychiatry that came into being. Anatomy emerged as the model science. Theodor Hermann Meynert, one of the early and most eminent representatives of psychiatry as reshaped by natural science, even objected to the term "psychiatry"; his textbook on mental disorders bore the title *Diseases of the Fore-Brain*. After more than 2000 years of uncontested power, the soul finally was eliminated from the field of scientific investigation and terminology to be replaced by an ever-increasing number of elementary functions assigned to an ever-increasing number of compartments of the human brain.

But toward the end of the nineteenth century natural science placed psychiatry under a new and heavy debt. One of the greatest ideas born in the nineteenth century was that of evolution.[3] While the eighteenth century witnessed the rise of the great doctrines of the development of the individual organism (embryogenesis), the nineteenth century sponsored the idea of an evolution of the whole of organized beings (phylogenesis). Whatever may remain as its final version, the idea of evolution threw new light on the study of the development of the individual organism.* To those who, much later, witnessed the full impact of an evolutionary idea on psychiatry, the new view appeared like a healthy and violent reaction to the purely static and descriptive approach. To be sure, physicians have always been studying the natural history of disease, and Emil Kraepelin, one of the most significant representatives of classification in psychiatry, even attempted to group mental disorders according to their duration and outcome, thus adopting a chronological criterion. But the truly new view, which originated in Vienna† at the end of the nineteenth century in almost complete isolation from centers of higher learning, was the interpretation of disease as the result of an individual's entire life history. From this point on the clinical history reached far beyond the history of symptoms; for the first time in medical science the history of disease was written as the unbroken biography of the patient, and also as the history of the human race, which each individual has to repeat. The same period witnessed the tremendous rise of the exact sciences, physics and chemistry. The new doctrine of nervous and mental disease paid tribute to them by interpreting mental life, abnormal or not, as the result of an interplay or an economy of energies. But all too frequently the doctrine has been understood simply to be blind mechanics of forces. In fact, in this doctrine the development of the individual was not left to chance; it seemed to follow a

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* Conversely, the development of the individual threw light on the history of the human race.

† The theories of Darwin, we read in Ernest Jones' biography, strongly attracted Freud. It was hearing Goethe's essay on "Nature" just before he left school that decided him to become a medical student. But this essay is far from conveying a mechanistic view of life.

general direction or to reveal a certain design.* It was through the idea of this design or type that the author of the new doctrine joined the evolutionists of the early rather than the late nineteenth century. A design was also discovered in the history of nervous symptoms, which emerged as fulfillments, although only symbolic fulfillments of an individual's needs and desires, thus revealing the secret purpose that is always behind man's expression. The least one can say is that, once again, psychiatry had become historical, thus Hippocratic, bringing us back to Pinel, though on a new level, and closing the circle of the nineteenth century, frequently and wrongly accused of lacking in great and lasting ideas.

Sedes Materiae

DESCRIPTION OF A PUBLIC INSANE ASYLUM IN THE DAYS WHEN PINEL RECEIVED HIS FIRST APPOINTMENT TO THE CHARGE OF THE BICÊTRE (GIVEN BY PARISET[4] IN HIS "ÉLOGE DE PINEL")

Vice, crime, misfortune, infirmity, diseases the most varied and the most revolting, all were heaped together and treated alike. The buildings were untenable. Men crouched there covered with filth, in cells of stone, narrow, cold, dripping, without air or light, and furnished only with a litter of straw, rarely renewed and soon infected,—hideous lairs in which one would have hesitated to shut up the vilest animal. The insane, thrown into these sewers, were at the mercy of their keepers; and their keepers were malefactors from the prisons. The wretched patients were loaded with chains and tied with ropes like convicts. Handed over thus to the cruelty of their guardians, they were made the butt of insulting raillery or of blind and wanton brutality. The injustice of their savage treatment transported them with rage; and despair and wrath inflaming their deranged minds, drew from them night and day cries and howlings that rendered still more dreadful the clanking of their chains. Some, more patient or more cunning, showed themselves insensible to such outrages: but they only concealed their frenzy, to gratify it more surely. They watched with their eyes the movements of their tormenters till, surprising them in a helpless attitude, they struck them with blows of their chains on the head or stomach, and dashed them dying at their feet. Thus ferocity on one side and murder on the other.

PINEL'S OWN ACCOUNT[5]

Nothing has more contributed to the rapid improvement of modern natural history than the spirit of minute and accurate observation which has distinguished its votaries. The habit of analytical investigation, thus adopted, has induced an accuracy of expression and a propriety of classification, which have themselves, in no small degree, contributed to the advancement of natural knowledge. Convinced of the essential importance of the same means in the illustration of a subject so new and so difficult as that of the present work, it will be seen that I have availed myself of their application, in all or most of the instances of this most calamitous disease, which occurred in my practice at the Asylum de Bicêtre. On my entrance upon the duties of that hospital, every thing presented to me the appearance of chaos and confusion. Some of my unfortunate patients laboured under the horror of a most gloomy and desponding melancholy. Others were furious, and subject to the influence of a perpetual delirium. Some appeared to possess a correct judgment upon most subjects, but were occasionally agitated by violent sallies of maniacal fury; while

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* I believe this design to be implied in the typical sequence of levels through which the individual passes in the maturation process. True, Aristotle, Harvey, and others had a metaphysical conception of this design. But Freud's purely energetic interpretation does not affect the basic idea of a design as revealed by the manifestations of the eros or the "innate schedule of the pre-ordained stages." The historian notes with interest that at the turn of the nineteenth century, J. F. Blumenbach called his *nisus formativus* an "energy truly vital."

those of another class were sunk into a state of stupid idiotism and imbecility. Symptoms so different, and all comprehended under the general title of insanity, required, on my part, much study and discrimination; and to secure order in the establishment and success to the practice, I determined upon adopting such a variety of measures, both as to discipline and treatment, as my patients required, and my limited opportunity permitted. . . .

. . . I first of all took a general statement of the symptoms of my patients. To ascertain their characteristic peculiarities, the . . . survey was followed by cautious and repeated examinations into the condition of individuals. All our new cases were entered at great length upon the journals of the house. Due attention was paid to the changes of the seasons and the weather, and their respective influences upon the patients were minutely noticed. Having a peculiar attachment for the more general method of descriptive history, I did not confine myself to any exclusive mode of arranging my observations, nor to any one system of nosography. The facts which I have thus collected are now admitted to the consideration of the public, in the form of a regular treatise. . . .

. . . Public asylums for maniacs have been regarded as places of confinement for such of its members as are become dangerous to the peace of society. The managers of those institutions, who are frequently men of little knowledge and less humanity, have been permitted to exercise towards their innocent prisoners a most arbitrary system of cruelty and violence, while experience affords ample and daily proofs of the happier effects of a mild, conciliating treatment, rendered effective by steady and dispassionate firmness.

PINEL'S METHOD IS ANALYTIC AND OBSERVATIONAL

I do not wish in any way to write a satyre but to describe the true story of a very real disease: I must therefore discard the popular meaning of *delirium*, *craze*, *confusion*, *insanity*, as well as all metaphysical discussions, all theories concerning the nature of intellectual or emotional functions and their genesis, their order, their reciprocal concatenation, their sequence. I rely entirely upon observation from which we learn the unsuspected truth that there can be a disorder limited to the perceptual sphere, to memory, to imagination, to judgment, to awareness of one's own existence, to volitional impulses, and that the combination of any number of these disorders having various degrees of intensity constitutes an infinity of types. It is all the more essential to stress these fundamental objects and to suggest their special study, should we wish to proceed more systematically in our observation of the phenomena of insanity, apply more successfully to this disease the analytical method and promote further progress in its history.[6]

THE HIPPOCRATIC ELEMENT IN PINEL

There are to be found in Pinel's treatise on mental alienation passages most impressive for their resemblance to certain Hippocratic texts. The author warns against taking the patient's original character ("as taciturn and gloomy with a strong tendency toward meditation") for a psychosis. An analogous passage can be discovered in the beginning of the Hippocratic book on "Prognostics": what may appear to be alarming ("to lie upon one's belly" or "to grit the teeth") may have been the custom of the patient from childhood.

Pinel's faithful description of the behavior, expressions, and voice of the insane recalls the famous description of imminent death in the same Hippocratic writing.

Here follows an example of Pinel's masterly descriptions:[6]

In a variety of mania one observes a continuous appearance and reappearance of emotions, serene or mournful ideas, threatening gestures or an expression of benevolence. The features of the face reflect alternatively as in an ever changing picture, fugacious passions, hope, terror, hatred, revenging impulses appearing in a flash and soon disappearing without leaving any traces. This variety of mania considered as a whole comprises also the cases of inexhaustible chatter, an extreme volubility of incoherent speech, with an irregular and unexpected recurrence of the most vivid and uncontrolled emotions; nothing is more repugnant than the sight of certain insanes who seem to be dominated by a sort of blind rage and who

utter shrill cries, outraging or obscene remarks, curses of all sorts with their eyes glowing, with their mouths foaming and the most bloody impulses.

PSYCHOTHERAPY OF PSYCHOSES IN THE EARLY NINETEENTH CENTURY[7] (VESTIGES OF EIGHTEENTH CENTURY RATIONALISM)

What, above all, distinguished the psychotherapy of insanity as practiced in the early nineteenth century (Reil, Heinroth, and others) from that of our contemporaries was the lack of systematic attempts to uncover the roots of the disturbance and the dynamics of its symptoms. The latter were attacked immediately. What was intended was the immediate re-establishment of a definite conduct, sanctioned by the rules of society and tradition, moral standards and religion. In other words, in the struggle between the mentally ill and reality, the latter was allowed to subdue the former without delay, without unfolding the abnormal psychodynamics at work and without a preliminary slow but progressive adjustment that would allow the patient to strengthen his power and ability to meet the requirements of reality and, above all, to gain insight into the necessity of complying with them. The direct approach, not too well timed, necessarily led the psychotherapist of psychoses to appeal to logic, reason, convincing and persuading procedures, all of which were believed to act directly on the patient and to produce the intended conduct with no intermediate step. Since the educational system of the time was similarly constructed, the psychotherapist turned to child education as the model of treatment. Hence admonition, intimidation, punishment, and reward emerged as corrective measures, Heinroth's conception of mental disease as self-inflicted punishment for sin certainly being of no small support. Force, pain, terror, intimidation, and all sorts of mechanical devices were not excluded, although never used without planning, and brutality and sadism were not allowed to appear on the list of indications for forceful measures, whose number was legion. Although the whole system of therapeutic procedures could hardly be reliable and although, indeed, disappointments were reported, above all, lack of lasting results, the psychotherapist as a rule did not realize that the criteria and measures of his own world and human society at large had ceased to exist to a large extent for the insane person, who, therefore, could hardly be brought directly into the orbit of the physician's logic and moral standards. Some psychotherapists indulged in imposing manners, royal appearance, "catching the eye" (Benjamin Rush), in brief, dominating the patient by their "strong personality"—procedures significant of the physician rather than the patient and again, as we know today, closing rather than opening an access to the psychodynamics at work, the discovery and transformation of which obviously were not intended and probably not even dreamed of.

ESQUIROL ON THE PASSIONS

To a modern reader, Esquirol's treatise on the passions[8] emerges as the most significant and most timely of all his writings. It almost overshadows in scope and plan those more technical works on which rests Esquirol's fame as a clinician and a pioneer of refined symptomatology and nosography.

It was hardly a coincidence that the first French psychiatric clinician wrote a treatise on passions. In fact, he treated a subject to which Descartes devoted one of his major writings. Even the title was similar in both Descartes' *Passions de l'âme* and Esquirol's *Des passions*, though Esquirol's qualifying addendum *considérées comme causes, symptômes et moyens curatifs de l'aliénation mentale* ("considered as causes, symptoms and means of treating mental alienation") is indicative of the very specific role the alienist wanted to assign to the passions. But it remains doubtful, to say the least, whether Esquirol approached the subject in a truly Cartesian manner. If one considers that Cartesianism in French philosophical thought and education was not questioned until very recently, Esquirol's figure and work gain a still greater timely significance.

By addressing the insane person and his thoughts, emotions, and actions in a most immediate and direct manner, unbiased by any nosological scheme or stigma, by meeting him on the common ground of man's nature and basic experiences, Pinel, for the first time in medical history, made psychiatry a chapter of the science of man or anthropology. By relating insanity to the passions, his pupil Esquirol anticipated psychological views of the genesis of neurosis and psychosis. Raised in the spirit and philosophy of Rousseau, who has always been considered a forerunner of the romantic movement, Esquirol traced man's greatness and also man's misery back to his faculty of perfecting his nature, of enlarging his sphere of knowledge and extending his relations, learning at the same time, it is true, to increase his pleasures, though at the expense of his originally sound organization. New needs, he taught, produce new desires and the latter produce the passions, ambition, thirst for money, honor, and fame, the true sources of physical and moral disorders.

Esquirol distinguished the passions from the primary impulses, such as love, anger, terror, and revenge, but in a way he related the passions to the primary instincts, from which, he said, they may become entirely detached, to assume an increasingly intellectual character. That he conceived the passions as the derivatives of the primary instincts, and that he identified them behind their intellectualized façade, links him indeed with contemporary psychology and psychoanalysis. That he used the passions for treatment marks another resemblance with the psychoanalyst trying to mobilize the patient's love, in order to focus it, though only temporarily, on the therapist's own person, ultimately to set it free again. What distinguishes the modern psychotherapist from Esquirol is that the latter aroused certain passions in the patient for no other purpose than simply to counteract others. Here we see applied to mental disturbances the age-old therapeutic principle *contraria contrariis*. What was intended was the re-establishment of a disturbed balance, undisturbed balance or harmony of the humors or the powers being the Greek criterion of health. Like his great teacher Pinel, Esquirol adhered to the principles of Hippocratic medicine. It was in this spirit that melancholic patients were given self-assuring and uplifting news, their desires satisfied, their hopes raised. But it was also in the same spirit that in other conditions fear and terror were provoked, which in still others they were silenced and dissipated. Insanity and its varieties, Esquirol taught, are nothing but excessive passions. Delirium closely resembles a state of anger. Mania is indistinguishable from arrogance. Who would not

identify, he asked, in the melancholic person's behavior the same expressions we see man display when driven to despair by worry, misfortune, or unjustice? Those who are familiar with the natural history of the passions and that of insanity, he concluded, will not treat the latter by arguments and formal logic. He agreed, it is true, that good advice, reasoning, and consolation do have their therapeutic effects. But these are obtained, he added, only after the patient has suffered an emotional shock (*secousse morale*), intended to produce the opposite of his actual state.

It is significant that Esquirol turned to the famous *crises* as to models of his moral treatment, again linking the latter with Hippocratic medicine and himself with his beloved teacher Pinel. Here may be the sources of Esquirol's endeavor to secure to the passions their physical basis. Other sources may be found in his intention to capture insanity from the metaphysicists and moralists and to make it, once and for all, a subject of medicine or "physics." Again, he confessed Hippocratic views when turning to the brain as the region where the passions display their effects, though only by sympathy, the immediate action being in the visceral plexus, love and hatred in the cardiac plexus, fear and anger in the diaphragmatic, sexual impulses and their derivatives in the genital ones. The medical historian recognizes Platonic views and the hierarchy of the souls. The modern physician is tempted to consider Esquirol's interpretations as anticipations of the physiology of the autonomic nervous system. But one gains the impression that in Esquirol's treatise, as in so many other works of its kind, the physical aspect of the passions ultimately remained unrelated to the main thesis, namely, the moral—that is to say, psychological treatment. Since Esquirol never substituted the physical processes underlying the passions for the passions themselves, he never denied the intrinsically psychological nature of his treatment.

K. W. IDELER: INSANE PASSION ADMITS OF NO PLANNED ACTION AND LEADS TO MONOTONOUS AND STEREOTYPED REPETITIONS[9]

It is true that passion puts reason to the rack by establishing logical connections among the delusions and thus often produces a true art of thought. But since thought is never corrected by experience, it becomes more and more entangled in contradictions making progress impossible. Insane passion with its lack of self-control can therefore hardly give birth to well-planned action, but loses itself in an obscure drive, a futile longing which cannot gain inner satisfaction from the phantoms of fantasy. In asylums one frequently encounters madmen who bring their alienation to a certain but limited stage of development, though the abundance and grandeur of their illusions might provoke the impression of a magic novel at its early stage which their fantasy apparently can go on spinning for ever. But soon insanity becomes stereotyped, ideas repeating themselves for years with fatiguing monotony, leaving no room for the receptivity and plasticity of the soul, which becomes as stiff as a mummy offering its petrified face to the spectator.

MOREAU DE TOURS
(FIRST ENGLISH TRANSLATIONS OF SOME SIGNIFICANT PASSAGES OF HIS WORK)

In his *Du Hachisch et de l'aliénation mentale*,[10] Moreau was anxious to demarcate his own intentions and efforts from those of his predecessors. Pinel, he said,[10] remained purely observational, and since Pinel was anxious to avoid metaphysical

discussions, he was more concerned with the outer signs and manifestations of insanity than with the analysis of the inner experiences of the mentally ill. The step from symptomatology to psychology was made by Esquirol.[10] Moreau, though remaining faithful to his predecessors, went still further.

For a better understanding of Moreau's contribution to modern psychiatry, it is necessary to recall his epistemological approach. He rightly stated that we have no immediate access to the specific experiences of the insane, whose language remains ambiguous.[10] We grasp only what we experience ourselves. Evidently, Moreau realized the analogical nature of our knowledge of a foreign consciousness. Here were the sources of his autoexperiment with hashish.[10] He identified the basic mental disturbance that emerged as the result of these experiments with that experienced in dreams on the one hand and insanity on the other.

The conclusion that this basic mental disturbance or primary fact (*fait primordial*) implied a change in the activity of all of our intellectual functions must be considered one of the most important and far-reaching concepts that Moreau formulated. Here also is the point where he deviated from his teacher Esquirol. The latter, it is true, was responsible for the first description of hallucinations. Though there were passages in Esquirol's writings foreshadowing Moreau's thesis of the basic identity of hallucinations and dreams,[10] Esquirol's approach remained primarily descriptive and symptomatological. But Moreau's discovery of the most fundamental and total change undergone in hallucinations or dreams led him to doubt the value of classifications, always resting, indeed, on symptoms;[10] above all, it led him to reject the term "hallucination" for which he substituted the term "hallucinatory state,"[10] intended to indicate the involvement of all our mental functions. Pursuing the idea of a basic modification of our inner life still further, he admitted of two entirely different modes of existence.[10] One is determined by our relations to the outer world; this is our common world. The other is the world of our dreams; it reflects the first world, from which it borrows its constituent material, but nevertheless remains separated from it. Sleep is the barrier between the two. In insanity there is a fusion between the two modes of existence, and the mentally ill finally emerges as an awakened dreamer.

THE TWO MODES OF EXISTENCE

It seems that two modes of existence, two ways of life* are allotted to man. The first of them stems from our relations with the external world, with the universe; this we share with our fellow creatures. The second is but the reflection of the first and thrives only, in a way, on the raw materials that are furnished by the first, though the two remained totally distinct.

Sleep is like a barrier erected between the two, the physiological border between the outside world and inner experience. As long as things remain in this state, there is perfect *mental health*, that is regularity of intellectual functions within the limits which have been assigned to each one of us. But it happens that under the influence of various causes, physical and mental, these two modes of existence tend to become confused; the phenomena proper to each one of them tend to become similar and to unite in the indivisible act of intimate consciousness or of the self. An incomplete fusion takes place, and the individual

* These and other formulas in Moreau's work strongly foreshadow existentialistic views. It seems that the genealogy of the school of Pinel reflects the passage from observational (Pinel) to psychological (Esquirol) and finally to existentialistic (Moreau) psychiatry.

without having completely abandoned reality, belongs, in many respects, by various intellects, relations, by false sensations, by erroneous beliefs, etc. to a private world. The insane is such an individual, the monomaniac especially who presents so strange an admixture of insanity and reason, and who, as has often been *repeated, dreams while completely awake*,—which sentence, though we do not wish to overemphasize its importance, expresses, according to us, exactly the psychological nature of insanity.[10]

HIS EXPERIMENTAL THOUGHT. HIS PHENOMENOLOGICAL APPROACH. EXISTENTIALISM ANTICIPATED: MENTAL ALIENATION—A SEPARATE MODE OF EXISTENCE

The aim pursued is to penetrate the inner turmoil. This is imperative for the alienist must follow as closely as possible the changes that take place in the inner existence of the insane. In order to penetrate still further into the incipient disease and follow not only its external and perceptible development, but also its internal evolution in the very depths of the consciousness, we must be able to study it on ourselves; or else, even though it may be infinitely less reliable, secure our information from the patients themselves. . . .

It is up to them to tell us what they have experienced and felt; and, in short, it is from their own accounts that we must learn what we are trying to discover. But are we sure that we can understand these patients when they communicate to us their observations, or is their experience necessarily incommunicable?

In our opinion, a delusion, however simple it appears to be and whatever rational aspect it may assume, can only be the result of a profound and radical modification of the intellect, of a general disruption of our faculties. It is indicative of a total transformation of the thinking being, at least within the limits of a given chain of ideas. It has, especially recently, been confused with *error*. This is a serious mistake, psychologically speaking. A madman *is not in a state of error*. He acts logically in a sphere essentially different from ours. . . .

In his madness, he has convictions against which neither the reason of others nor even his own can prevail; in the same manner that no reasoning, no thought conceived in a waking state can correct the reasoning and thoughts of dreams. The same difference exists between insanity and normality in a given individual as between his dreams and his waking state. Delusions are, so to say, only fragments, truly periodical phenomena of a dream, which, within the limits of these ideas, continues after wakening. At all times popular opinion has adhered to this truth in applying specifically the term of *dreamer* to those insane obsessed with delusions. . . .

In our opinion, mental alienation is a separate mode of existence, a type of inner life whose constituents and materials have necessarily been gathered in the real or positive world which it merely reflects and echoes. Dreaming is its most complete expression; we might say that it represents its normal or physiological equivalent.[11]

THE GENIUS—A NEUROTIC?

Is *genius*,—the highest expression, the *nec plus ultra* of intellectual activity,—no more than a neurosis? Why not? Such a definition is quite acceptable, it seems to us, as long as we do not ascribe to the term neurosis as absolute a meaning as when it refers to the different states of the nervous centers, as long as we consider it to be simply the synonym of exaltation (we do not say disturbance, perturbation) of the intellectual faculties.[12]

THE GENIUS—AN INSANE PERSON?

Let us repeat it once more, for this truth is the cornerstone of our work: whenever there is insanity there is overactivity of the mind, hence either disintegration, incoherence of ideas (*maniac state*), or abnormal cohesion of the same ideas (monomania): it is by reducing this overactivity, by disrupting this cohesion, that reason can be reestablished and that man can regain his *self-power*: we must remove and modify, but, to substitute reason for insanity, we must not add.

Thus we understand that the organic conditions most favorable to the development of the faculties are precisely those which give rise to delusions.

The unusual accumulation of vital forces in an organ can have two results: a more intensive functioning of this organ, but also a greater danger of aberration and deviation of the same functions. One of the most conclusive proofs of our thesis is that the state in which intellectual power reaches its peak is so enlightening that ancient philosophers attributed its origin to Divinity itself; this state of *inspiration* is the one which is almost analogous to real insanity. It is here that insanity and genius are so close together and indistinguishable that they become nearly synonymous.[12]

What can overactivity be in relation to the organ of thought? In what way, by what signs will its activity be manifested? Obviously, by more numerous ideas, by accelerated thought, by greater drive, by more spontaneity in imagination, by more originality in the turn of thoughts and associations of ideas, by greater novelty and variety in these associations, by more vivid memory, by more audacity in the products of imagination, by more mobility and also by more energy and more drive in the instincts and in the emotions.[12]

If this excitement goes beyond certain limits, if by the violence of its activity it dominates the self, that is the inner principle which relates and coordinates the action of the various intellectual powers; instead of elevating the qualities of the mind and giving them an unusual luster, it leads directly to insanity. By all means, . . . it would be a preposterous mistake to seek the source of genius or even intellectual superiority solely in the organic conditions just mentioned. There always remains an unknown factor (*quid divinum*); otherwise, a genius would be as common as it is rare, by the ease with which each person could obtain it through the help of brain stimulants. But it is equally certain that those conditions are extremely favorable to intellectual achievements.[12]

DISEASE AND MENTAL ABILITY

May I quote a gifted individual, Gérard de Nerval, who spent part of his life in a mental state extremely close to the one we are discussing:

"I shall endeavor . . . to transcribe the impressions of a long illness which took place entirely within the mysteries of my mind;—and I don't know why I am using the term illness, for never, from my own point of view, have I been in better health. At times, I believed that *my strength and my activity* were doubled; I seemed to *know everything*, to *understand everything; my imagination brought me infinite pleasures*. In recovering what man calls reason, must I regret the loss of these powers?" [Quoted from *Le Réve et la Vie*, p. 42.]

What alienist has not heard a thousand times these words repeated by unhappy psychotics who after having regained their sanity, regretted their past state, this new life, this "*vita nuova*", which Gérard defined as "*The invasion of reality by a dream world*".[12]

DREAMS AND INSANITY

In our opinion, mental alienation is a separate mode of existence, a type of inner life whose constituents and materials have necessarily been gathered in the real or positive world which it merely reflects and echoes. Dreaming is its most complete expression; we might say that it represents its normal or physiological equivalent. Dreams express it most completely; one might say that dreams represent its normal or physiological type. In certain respects, man in his dreams fully experiences all the symptoms of insanity: delirious convictions, incoherence, false judgment, hallucinations of all senses, panic, tantrums, irresistible impulses etc. In this condition self-consciousness, consciousness of our true individuality, of our relations with the outside world, spontaneity, freedom of intellectual activity are suspended or, in other words, function in a manner essentially different from the waking state. A single faculty survives and acquires an energy, a power without limits. Far from being subordinate, as it was in the normal or waking state, imagination becomes sovereign, absorbing and, in a way, assuming the whole mental activity. . . .

It follows from these general considerations:

1. As we stated previously. There is no such a thing as *hallucinations*, in a true sense, but rather *hallucinatory states*.

2. One must regard hallucinations as a very complex psychological phenomenon which is, so to say,

but one aspect of the activity of the mind, isolated from the outside world and limited to its purely cerebral life.

3. The hallucinatory state necessarily comprises all the elements which in the functioning of the moral faculties are concerned with the specialized senses, to general sensitivity both external and internal. In this condition identical (from the psychic standpoint) with the dreamy state, the mind, completely reduced to its inner experience, affected in various ways in its auditory, visual, tactile faculties, carries into reality the products or creations of imagination; while remaining convinced that it has heard, seen, touched, as usual, in truth it has only seen, heard, and touched in imagination.

It makes a difference whether we imagine an impression in such and such a manner or whether we have a real impression. But such is not the case, when we are dreaming; for then there is absolutely no difference, and the dreamer receives as real an impression as a person who is awake.

What holds true for the dreaming state, holds equally true for hallucinatory insanity where sensations are as vivid, I nearly said as real as in a state of insanity.[10]

MOREAU'S METHOD. I.

I am not theorizing in the manner of an outside observer who can study the phenomena of insanity only superficially and whose knowledge of the origin, development and concatenation of these phenomena is gained by a more or less fallacious inductive method. I am relating simply what I have observed on myself, and with the same assurance, the same certainty of not being deluded that each one of us has in affirming what he thinks, what he reasons, what he imagines, what he remembers.[10]

MOREAU'S METHOD. II.
HE RELIES ON SELF-OBSERVATION AND AUTOEXPERIMENT

. . . Are we sure that we are able to understand these patients when they communicate to us their own observations? Are they not on the contrary speaking a language necessarily foreign to us? How could they impart the feelings which disturb them? What have we learnt when they tell us that an irresistible instinct possesses them, that some inexplicable obsessive idea dominates them whatever they may do to free themselves from it, that their thoughts follow each other, become involved and confused with an uncontrollable speed, that they see objects, hear noises and voices which exist as it is commonly said only in their imagination? . . . It is very clear that we see here only the façade; we cannot penetrate any further, grasp the causes and the concatenation of the mental aberrations of which they speak. Manifestations of the intellect and especially emotions, are similar to sensations in that they cannot be known or evaluated except from the standpoint of one's own experience. To have a conception of any pain whatever, we must have experienced it; to know the thoughts of an insane, we must have had similar thoughts ourselves, but while remaining fully aware of the delusion.[10]

THE FUTILITY OF CLASSIFICATIONS

While admitting the usefulness of classifications, let us not exaggerate their importance or forget, as the authors themselves confess, that the distinction established by such classifications are concerned with the form rather than with the contents of delirium, with its external and apparent character rather than with its essential and intrinsic nature. Let us not forget that in practice quite a number of diseases present in various combinations and mixtures all the characteristics proper to the divers types of mental alienation. The various forms which express the generic character of insanity being common, as Esquirol says, to many mental diseases of very different nature, treatment and outcome, cannot characterize the species and varieties of insanity which occur with endless variations. Alienation can assume successively and alternately all these forms; monomania, mania, dementia alternate with each other, take the place of one another and become complex in the course of the same disease in a single individual. It is this truth that has induced some physicians to reject any distinction whatsoever within insanity and to admit the existence of but one mental disease which assumes various disguises.[10]

C. G. CARUS ON THE UNCONSCIOUS

Carus[13] distinguished an absolute from a relative unconscious. In the former,

he included all formative, destructive, and reparative life processes. He adopted the Aristotelian identification of life and soul, and his psychology was the first design of a biological view of mental life. By relative or secondary unconscious he understood that unconscious that once had been conscious but had returned to the unconscious. Many an obscurity, difficulty, and error encountered in psychological investigations resulted, he believed, from ignoring the significant interrelation of the conscious and unconscious. Disease, he taught, is the result of conflict between the unconscious vital functions and foreign influences reaching the organism from the surroundings in health and disease. In terms of his romantic and allegorical vocabulary, difficult to grasp for a twentieth-century reader, disease is a parasite emerging between life and world. More intelligible was his statement that the true essence of the organism is not denied by disease. He distinguished the fundamental plan of disease from its symptoms or changed functions. The fundamental plan or basic idea of disease remains unconscious and always originates in the unconscious. Carus did not admit of any disease of purely conscious origin; he interpreted mental disease as the repercussion of the unconscious on the conscious. He believed the unconscious to be particularly vulnerable, while he allowed the highly evolved conscious to be more resistant. True, he repeatedly stressed the powerful influence of the unconscious on the conscious, but at the same time, he left the unconscious under the protective influence of the conscious, thus preventing the spread of disease from the unconscious to the conscious.[14]

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A Guide for Physicians Regarding Transportation of the Incapacitated by Aircraft

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The present increase in air travel has brought numerous inquiries to the traffic and medical departments of the various air lines, from physicians, hospitals, and prospective passengers who are ill, as to the advisability of air travel.

The body of man is designed and constructed to function properly at the bottom of a large ocean of air. This volume of air exerts a definite amount of pressure on that body, but it can perform reasonably well under conditions beyond the normal limitations. However, during flight, the stresses encountered may far exceed the customary limits and will cause changes in the physiological processes.

In order for the passenger to be protected from the dangers of high altitude flight, it is necessary for us to understand the physical characteristics of the atmosphere that affect these processes. The most important characteristics of the atmosphere are temperature, pressure, and oxygen content.

The atmosphere is made up of two layers. The layer immediately surrounding the earth is known as the troposphere, and this is surrounded by a layer known as the stratosphere. Tropopause is the name given to the boundary between these two layers. The troposphere has a varying moisture content, turbulent air, and a constant rate of decrease in temperature, which increases with height above the earth. All phenomena of weather that occur only in this layer are caused by the physical effects of variable temperature, winds, and moisture.

The stratosphere is characterized by air with almost complete absence of moisture and turbulence. The temperature is fairly uniform but does vary slightly at different altitudes, and perceptibly with latitude. The height of the tropopause varies with the latitude and the seasons. This variation is caused by the earth's receiving much more solar energy in the region of the equator than at the North or the South Pole.

A person who makes a trip by aircraft is, of course, subjected to atmospheric pressure changes. The aircraft must ascend and descend, which means there will be changes in altitude and thus, in turn, changes in atmospheric pressure. The stresses encountered during flight, which are of particular importance to the person with a disease condition or disability because of the effects of such stresses on body functions, are reduction in oxygen and lowered atmospheric pressure.

If we are to understand some of the problems of flight we must study the composition and pressure of the atmosphere. Table I shows the composition of the atmosphere at sea level. This is a relative percentage composition and it is the same at all altitudes. Table II shows the atmospheric pressure at various altitudes. At sea level the barometric pressure is 760.0 mm. of mercury or 14.70 pounds per square inch (p.s.i.).

With the changes in barometric pressure, the actual molecular concentration of

TABLE I

Composition of N. A. S. A. Standard Air at Sea Level: Average Volume of Component Gases

Component	Per cent
Nitrogen	78.09
Oxygen	20.94
Argon	0.93
Carbon dioxide	0.03
Neon	0.0018
Helium	0.0005
Hydrogen	0.00005
Krypton	0.0001
Xenon	0.000008
Ozone	0.00001
Radon	6.0×10^{-18}

any gas, and hence its availability to the body, can be expressed best in terms of partial pressure. The physiological effects of reduced barometric pressure are stated in Henry's law: With a constant temperature, the quantity of gas that goes into solution is proportional to the partial pressure of the gas concerned. Each gas in the mixture comprising the earth's atmosphere exerts the same pressure that it

TABLE II

Altitude Pressure Table

Altitude, feet	Mm. of mercury	p.s.i.
0	760.0	14.70
1000	732.9	14.17
2000	706.6	13.66
4000	656.3	12.69
6000	609.0	11.78
8000	564.4	10.91
10000	522.6	10.11
12000	483.3	9.35
14000	446.4	8.63
16000	411.8	7.96
18000	379.4	7.34
20000	349.1	6.75
22000	320.8	6.20
24000	294.4	5.70
26000	269.8	5.22
28000	246.8	4.77
30000	225.6	4.36
32000	205.6	3.98
34000	187.3	3.62
36000	170.3	3.29
38000	154.8	2.99
40000	140.7	2.72

would if the other gases were not present. The total barometric pressure at any altitude is the sum of the pressures of the component gases.

Standard atmospheric air is 20.94 per cent oxygen and 78.09 per cent nitrogen. As previously stated, the total pressure (all gases) at sea level is 760.0 mm. of mercury (14.70 p.s.i.). Assuming that the air is dry, the partial pressure exerted by oxygen at sea level is $20.94/100 \times 760.0 = 159$ mm. of mercury (3.1 p.s.i.). The partial pressure of nitrogen at sea level is $78.09/100 \times 760.0 = 593$ mm. of mercury (11.6 p.s.i.). By using the altitude pressure table, the pressures of the other gases may be similarly calculated. At 10,000 feet the barometric pressure is 10.11 p.s.i. or about ⅔ of that at sea level. The partial pressure exerted by oxygen is $20.94/100 \times 522.6 = 109.2$ mm. of mercury. At 18,000 feet the barometric pressure is 379.4 mm. of mercury (7.34 p.s.i.) or ½ the pressure at sea level. The ambient pressure of oxygen is 79.2 mm. of mercury (1.5 p.s.i.), or ½ the pressure at sea level. At 27,000 it is $^1/_3$, at 33,400 feet it is $^1/_4$, and at 38,500 it is $^1/_5$ of the pressure at sea level.

The blood oxygen saturation at sea level is 95 per cent, at 10,000 feet 90 per cent, and at 14,000 feet it drops to 85 per cent. While the percentage of oxygen remains the same, there is not enough pressure to drive the oxygen from alveolar air into the lung capillaries. Thus the lowering of the amount of oxygen in the blood decreases the availability of the oxygen for the tissues.

Thus in normal persons, rapid ascent to higher altitudes without supplementary oxygen will result in sudden loss of consciousness from cerebral hypoxia. Some observers have noted that a person exposed to altitudes of 26,000 feet remains conscious for about 3½ minutes (220 seconds). The period of useful consciousness decreases about 20 seconds with each 1000-foot increase in altitude.

In a gradual ascent to higher altitude a person may first experience sensations of excitement, exhilaration, and well-being, but as the oxygen lack becomes more severe, other manifestations of hypoxia develop insidiously, including mental and sensory dullness, muscular weakness, headache, vomiting, cyanosis, and dyspnea, with the danger of development of fixed ideas accompanied by impairment of self-criticism and of judgment.

In persons whose ability to oxygenate tissue is handicapped by respiratory or cardiovascular pathology, the effects of hypoxia become apparent at much lower altitudes than in normal persons, and the consequences may be more serious.

We should remember that the relatively acute hypoxia such as is encountered in flight tends to increase pulmonary vascular resistance. This increased load on a person already suffering from a condition that places a burden on the right side of the heart could cause the situation to be intolerable.

Although hypoxia may be more serious in its consequences, the effects of progressive reduction in atmospheric pressure at high altitudes can be more uncomfortable. During the ascent, the volume of any free gas within the body tends to increase in accordance with Boyle's law, which states that the volume of a gas is inversely proportional to the pressure exerted on it.

Aircraft that fly at altitudes exceeding 10,000 feet are pressurized, with the cabin pressure altitude being well under 8000 feet. An abrupt exposure to 15,000 feet from a pressure cabin that was at 8000 feet due to loss in cabin pressure might be very

serious for a person with cardiac disease. The chief difficulty arising from sudden, explosive decompression is the very rapid onset of anoxia. Therefore, modern aircraft are equipped with oxygen masks and tanked oxygen for immediate use in an emergency for persons with heart disease who are flying in pressurized aircraft. In the event of sudden loss of pressure, the anoxemia could be prevented by the use of oxygen, and the danger from such an explosive decompression would be of little consequence to the cardiac patient. In the event that oxygen is required for a long period of time for a patient with cardiac disease, it is well to make such arrangements prior to the flight.

Although anoxia is the basic difficulty, there is another condition involved in aerial flight that may be hazardous to a patient suffering from some cardiac disorder. On some flights there may be considerable turbulence and the resultant acceleration may cause the passenger to become motion sick. This will increase the hazard of anoxia and so precipitate the patient into an intolerable situation. Therefore, it is advisable to take all necessary precautions in the prevention of motion sickness in flight passengers who are known to have some cardiac disability. No normal person is immune to motion sickness but only about 10 per cent of all adults are highly susceptible.

In addition to motion sickness, the factor of anxiety may conceivably arise during flight and could cause further difficulty. Cyclizine, 50 mg., is the drug of choice in motion sickness.

Gases expand so that they occupy twice as large a volume at 18,000 feet as at sea level, with further expansion to four times that at sea level at 34,000 feet, and six times as much at 42,000 feet. The resulting distention of stomach and intestines can cause considerable discomfort in normal persons, unless flatus can be passed, and may be a hazard in persons with gastroenteric or cardiac pathology.

Flight passengers are not exposed abruptly to altitudes of 10,000 feet or more. There is a suitable period of time during which the airplane passes from ground level to high altitude (at the rate of about 300 to 500 feet/minute), and during this period the passenger can adjust himself to the changing environment. In flights up to an altitude of 10,000 feet, the adjustment is made very easily by most persons. Pressurization prevents oxygen deficiency associated with high-altitude flying and at the same time eliminates the need for oxygen masks for passengers and crew members.

In evaluating whether or not a patient can tolerate travel by air, the factors to be considered are: the condition of the patient—whether reduction of oxygen or pressure may be detrimental to him, whether special care will be required, and whether the patient's condition may be disturbing to other passengers; the type of airplane and flight—whether type of airplane, altitude, weather, or duration of flight may create problems, and what facilities are available in the airplane for the care of patients.

Deciding whether or not any incapacitated passenger may travel by air as an ordinary passenger is greatly simplified if various altitudes are converted to their respective effects on body gas volume and on arterial oxygen saturation, as is done in table III. Almost every patient who can travel by other means can travel by air, in present-day aircraft. Briefly, the policy that should be followed in dealing with

TABLE III

Effect of Altitude on Body Gas Volume and Arterial Oxygen Saturation

Altitude, feet	Relative body gas volume	% arterial O_2 saturation
Sea level	1.0	96.0
5000	1.2	92.0
10,000	1.5	88.0
15,000	1.9	80.0

prospective passengers is that the traveler should "look, walk, act, talk, and smell normal." This policy was adopted about 15 years ago by the Airlines Medical Directors Association.

The airlines have long recognized the problems involved when passengers elect to travel by air while suffering from a physical disorder, and a provision has been inserted in the travel regulations of the Civil Aeronautics Board dealing with the right to withhold transportation (see figure 1).

SUGGESTIONS FOR THE ATTENDING PHYSICIAN

Heart Conditions. A few years ago it was the belief of many in the medical profession that air transportation must be denied to all persons who were known to have cardiac disease, the only exception being an emergency. This opinion no longer prevails. With pressurized cabins, added comforts, and improved conditions, many of these patients are now allowed to fly provided that adequate preparations are made prior to flight and that they are given a sedative to overcome any apprehension of flight.

Valvular Heart Disease. Patients with heart conditions that are compensated for may be accepted for air travel. These patients should not fly in altitudes greater than 8000 feet in nonpressurized aircraft. In pressurized or unpressurized aircraft, they should be given oxygen at cabin altitudes greater than 5000 feet. In some cases oxygen should be given from the time the airplane leaves the ground.

Valvular Heart Disease. Patients with uncompensated heart conditions should not be accepted for air travel unless oxygen is provided continuously throughout the flight.

Congenital Heart Disease. Patients who cannot tolerate the climb of one flight of stairs should be rejected for air travel.

Coronary Thrombosis. The patient with acute coronary thrombosis should not be approved for air travel under any circumstances. A person with healed coronary thrombosis, who is free from symptoms and discomfort, can be accepted for normal air travel. It is recommended that such patients not fly within six weeks after the initial attack. Oxygen should be available at all times.

Angina Pectoris. Patients with anginal disease with recurrent pain on exertion should not travel by air because of the possibility of left ventricular failure or sudden coronary thrombosis. The fact that the air traveler must climb stairs to board the aircraft should be kept in mind in these cases.

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LOCAL AND JOINT PASSENGER RULES TARIFF NO. PR-4 — Cancels 4th Revised Page 9

RULE	SECTION I—GENERAL
6	REFUSAL TO TRANSPORT

(A) Carrier will refuse to transport or will remove at any point, any passenger—

(1) Government Request or Regulations—whenever such action is necessary to comply with any governmental regulation, or to comply with any governmental request for emergency transportation in connection with the national defense, or whenever such action is necessary or advisable by reason of weather or other conditions beyond its control (including but without limitation, acts of God, force majeure, strikes, civil commotions, embargoes, wars, hostilities or disturbances) actual, threatened or reported;

(2) Passenger's Condition—whose status, age, or mental or physical condition is such as to—

(a) render him incapable of caring for himself without assistance, unless—

(i) he is accompanied by an attendant who will be responsible for caring for him enroute, and

(ii) with the care of such attendant, he will not require unreasonable attention or assistance from employees of the carrier;

(b) make such refusal or removal necessary for the reasonable safety or comfort of other passengers; or

(c) involve any unusual hazard or risk to himself or to other persons (including, in cases of pregnant passengers, unborn children) or to property.

(3) Groups of Children. NE will refuse to transport a group of seven or more children under 12 years of age unless the group is accompanied by a passenger at least 21 years of age for each multiple of seven children in the group.

(B) Across International Boundaries. Carrier will refuse to transport any passenger across any international boundary if—

(1) the travel documents of such passenger are not in order;

(2) for any other reason, such passenger's embarkation from, transit through, or entry into, any country from, through, or to which such passenger desires transportation would be unlawful; or

(3) such passenger fails or refuses to comply with the rules, regulations, and instructions of the carrier.

(C) Liability. Carrier is not liable for its refusal to transport any passenger or for its removal of any passenger in accordance with the preceding paragraphs of this rule, but such carrier will, at the request of the passenger, refund in accordance with Rule 77 (Refund—Involuntary).

For explanation of abbreviations, reference marks and symbols used but unexplained hereon, see Page 6.

ISSUED:	ISSUED BY:	EFFECTIVE:
September 25, 1959	C. C. SQUIRE, Agent Air Traffic Conference of America 1000 Connecticut Ave., N. W. Washington 6, D. C.	October 25, 1959

(Printed in U.S.A.) CORRECTION NO. 559

FIG. 1. Provision concerning right to withhold transportation in travel regulations of the Civil Aeronautics Board.

High Blood Pressure. Any patient with severe high blood pressure should be advised not to travel by air. As a guide, a person with a blood pressure rate higher than 200/100 should not make long trips by air. The patient with mild uncomplicated hypertension should offer no problem in acceptance for flying. The administration of a mild sedative prior to the flight is of value.

Respiratory System. Very slight compensatory pulmonary changes are required in the respiratory organs of healthy persons to adjust themselves to the usual pressurized cabin altitude of 8000 feet. However, for persons with respiratory disease, careful consideration must be given as to whether the patient will be able to tolerate such changes without aggravating the condition.

Upper Respiratory Infections. Acute pharyngitis, sinusitis, and the usual type of upper respiratory infections that cause congestion of the tissues of the nose and throat may cause blockage of the eustachian tubes and sinuses, resulting in inability to ventilate the passages and pain in flight or after descent. Usually the use of one of the vasoconstrictor drugs will cause shrinkage of the inflamed tissues, with resulting satisfactory ventilation of the sinuses and middle ear and relief of painful symptoms. However, the patient with a severe, acute head cold should be advised to delay air travel until the symptoms have subsided.

Asthma. Patients with severe cases of asthma should be advised against air travel. During an acute attack of any degree, the patient should not undertake air travel. Patients with mild asthma may fly between attacks without difficulty.

Tuberculosis. Patients with active tuberculosis or cavitation should definitely be rejected for travel by air, as should patients under tuberculosis treatment with pneumothorax. In the latter type of case, the increase in intrathoracic pressure may, through pressure effects on the heart, large vessels, and sound lung, cause death.

Lung Cancer, Pulmonary Abscess, and Extensive Fibrosis. In such cases air travel should not be advised. If the patients are comfortable at rest they may be flown but should be covered by oxygen at all times. Pulmonary reserve should be carefully evaluated before flight.

Bronchitis, Bronchiectasis, and Pneumoconiosis. Persons with these conditions can be accepted for air travel unless the conditions cause definite respiratory embarrassment. The administration of oxygen may be indicated at cabin altitudes greater than 5000 feet.

Pneumonia. Pneumonia patients should not travel by air. If they must be accepted because of emergency conditions, the extent of involvement of the lung must be known and it must be ascertained that the pulmonary reserve is not seriously endangered. All such patients should be given oxygen at all times during flight to assist in maintaining normal oxygen blood levels.

Foreign Bodies in the Lung. Patients with foreign bodies in the lung may be flown at any time but should be covered by oxygen at all times. If acute pulmonary edema occurs during flight, the patient should be deplaned immediately for emergency treatment.

Blood Disease. Anemic patients with a blood count of less than 3,000,000 or a hemoglobin less than 60 per cent should be rejected for air travel. Patients who have had a recent transfusion should not fly until after the danger of a reaction is past.

Oxygen should be available to prevent the development of hidden anoxia. Patients with leukemia should be rejected because of the possibility of anoxia. If in an emergency they must be flown, oxygen should be given continuously after the cabin altitude reaches 5000 feet. It is advisable to give a transfusion to such patients before the flight and to have oxygen available during the flight.

Diabetes. Patients with uncomplicated diabetes not requiring insulin in flight may be accepted for air travel. Inasmuch as there are no facilities on board for giving hypodermic injections, the severely diabetic patient on insulin should refrain from air travel unless he carries his own equipment required for his medical care and is trained in its use. He should adhere strictly to schedule regarding his meals and injections. He should also carry a supply of sugar or candy to be taken in the event of air sickness, which would lead quickly to a condition of hypoglycemia.

Nervous System.

Mental Disease. Psychopathic persons are very often susceptible to becoming air sick. Passengers with mental deficiency of mild degree may be carried subject to approval of the air carrier's district traffic manager and medical department. Such passengers may be carried without an attendant. Patients suffering from any severe psychosis should not be transported by air because of the disturbance that such a passenger might create in the aircraft and the difficulty of controlling such a patient. When air travel is considered possible in certain designated cases, such passengers should be accompanied by a qualified guard, and preferably a physician. In some cases travel should be allowed only on a chartered airplane that carries no other passengers.

Nervous Patients. Those patients who are nervous and highly excitable can usually be well controlled by sedation and make satisfactory passengers. They should be given a sedative before flight and the stewardess should be instructed in writing to continue sedation in flight.

Epilepsy. Epilepsy has a tendency to manifest itself at high altitudes due to anxiety, hyperventilation, and mild hypoxia. Epileptic patients should not be accepted for air travel. If they must fly, they must be evaluated for the conditions anticipated during a specific flight and should be accompanied by an attendant.

Disease of the Central Nervous System. These patients may be accepted for air travel provided they do not require assistance. However, if bowel and bladder control are lacking, rejection is mandatory.

Contagious Diseases. The common contagious diseases, such as diphtheria, measles, mumps, whooping cough, scarlet fever, and tuberculosis, are regulated in aircraft travel just as in any other travel involving the crossing of state lines. They come under the jurisdiction of the Bureau of State Services of the United States Public Health Service and are not acceptable for air travel at any time. If a case develops en route, the health officer of the municipality in which the airplane lands should be notified immediately.

Poliomyelitis. Patients who have had poliomyelitis are acceptable for air travel provided one month has elapsed since onset (i.e., the condition must be noninfectious). Limiting factors would be inability to walk to the washroom and respiratory involvement (bulbar) during illness. An attendant is necessary if the

patient is not mobile. Oxygen must be available. Patients with bulbar poliomyelitis are not acceptable.

Accident Cases. Patients wearing a plaster cast will be transported if the cast is not of such size or shape as to prevent the passenger from being accommodated by the regulation seat, and if the cast has no objectionable odor.

Patients whose mandibles are fixed either by jaw-wiring or by head traction are not advised to fly because of the possibility of air sickness and aspiration of vomitus.

Surgical Conditions.

Convalescent Surgical Patients. Convalescent surgical patients may be accepted for air travel provided they do not require dressings and other special attention en route.

Most patients who have had simple laparotomy such as appendectomy or herniotomy can be accepted for air travel after 10 days without danger of damaging the sutures. Patients who have had major procedures such as gastrectomy or bowel resection should not travel for at least six weeks, preferably two months. Patients with active peptic ulcer should not be accepted. Those with nonactive peptic ulcer can be transported by air, although there is a slightly increased possibility of perforation due to increased intragastric and intraintestinal pressure because of expansion of intestinal gases at increased altitude.

Gall Bladder Disease. Gall bladder disease in a passenger should not interfere with air travel.

Colostomy Cases. Persons with a colostomy should not be accepted for air travel because of the difficulty of caring for them on the aircraft. If they must travel by air, they may be accepted for flight provided the colostomy opening is nonodorous and the colostomy bags are emptied before flight. There is a tendency, due to increased abdominal pressure, for the colostomy bag to fill during flight. Disposable colostomy bags may be used.

Urinary incontinence and other odorous cases are also not acceptable.

Persons with any illness that might cause annoyance or objection to other passengers due to odors will not be carried.

Scrotal or Other Large Unsupported Hernia Cases. Patients with such conditions should be advised against air travel due to the possibility of complications developing at high altitude, as a result of the expansion of intestinal gases. This situation also applies in cases of strangulated hernia, intestinal obstruction, or perforated abdominal organs.

Locomotor System. Passengers with physical disabilities of the limbs may be accepted for air travel if they are able to care for themselves without any more attention or assistance from employees of the air lines than can be expected by any able-bodied passenger.

Intoxicated Persons. The obviously intoxicated passenger should not be accepted for air travel. He can be a nuisance to fellow passengers and crew and he usually requires much more care and attention than any other passenger on board. Common sense suggests the refusal of such passengers for air travel.

Drug Addicts. The drug addict should not be accepted for air travel.

Old Persons. There are no objections to air travel for older passengers as long as

they have no organic disease. The cardiorespiratory system particularly should be satisfactory.

Children and Infants. Children and infants may be accepted for air travel from 14 days after birth. The feeding of infants should be carried out while the plane is descending in order to assist in the opening of the eustachian tubes and to prevent possible subsequent ear trouble.

Pregnant Women. Pregnant women who habitually abort should be advised against flying. All patients with normal pregnancy who are not beyond the eighth month may be accepted for transportation by air on domestic, transoceanic, and other international flights. Furthermore, for all flights except transoceanic, a woman may fly in the ninth or last month of pregnancy if the estimated date of birth of the baby is not less than five days of the date of departure. An obstetrician's certificate is required to the effect that said obstetrician has examined the woman and found her to be physically fit for transportation by air and also stating the estimated date of the birth of the baby. Such certificate should be prepared in triplicate, one copy to be retained by the passenger agent at the originating station, while the second and third copies will be held by the passenger for interline use or other reference en route. If the estimated date of the birth of the baby is within five days of the date of departure, the woman should not be accepted for air transportation. Pregnant women should sit in backward-facing seats whenever possible so that the retention belt need not be tight on take-off and landing.

Blind Passengers. Passengers with impaired vision may fly whether or not they are accompanied by another passenger. A dog trained to lead the blind, when properly muzzled and harnessed, will be carried free of charge in the aircraft cabin when accompanied by a person with impaired vision who is dependent on such a dog. The dog will not be permitted to occupy a seat.

Stretcher Cases. Passengers being transported by stretcher can be accepted for carriage in most aircraft. A qualified attendant must accompany such a patient. Full details must be obtained and prior approval for travel must be given by the air lines medical department and other air lines personnel concerned. In the majority of cases it is necessary to remove aircraft seats to provide space for the stretcher, and in view of the general difficulties of rendering satisfactory care to stretcher cases, it is desired that such cases be carefully appraised before acceptance by the air line. However, where the saving of a life is involved, the air lines practice is substantially to disregard factors of inconvenience to other passengers and to accept the proposed passenger, provided such acceptance does not offer a threat to the safety or health of other passengers.

Under practically no circumstances should authority be given for air travel of prospective passengers in the terminal stages of illness, with a view to the rapid transfer of the patient to a distant point, where death may occur among friends or loved ones. The difficulties and hazards in performing this humanitarian type of service far outweigh the commendable desire that these cases should be accepted.

SUGGESTIONS AS TO PROCEDURE

In arranging air travel of incapacitated persons, the attending physician should

make contact with the air lines' reservation office and speak directly to the manager on duty. He should give the manager the following information: the diagnosis of the illness; the condition of the patient (whether ambulatory or a stretcher case); assurance that the passenger will provide and be financially responsible for: an attendant if necessary, any special equipment and supplies, the delivery to the plane of an adequate supply of oxygen in a tank of proper size for storage aboard the aircraft, all necessary masks and gauges required for the administration of the oxygen, authorization to return the empty tank via air freight at the passenger's expense, and an ambulance to bring the patient to the aircraft and an ambulance to meet the patient when the aircraft arrives at the destination.

When the manager on duty in the reservation office has this information, he will contact other air lines personnel involved for clearance and to handle other details to make the patient's flight pleasant and comfortable.

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Muscle Cramps in Postparalytic Poliomyelitis Treated with Hesperidin–Ascorbic Acid

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WILMINGTON, DEL., AND PHILADELPHIA, PA.

Acute and postparalytic poliomyelitis patients present many physiological disturbances of the neuromuscular, circulatory, and metabolic systems.[1–5] One or more of these pathophysiological changes is responsible for the production of painful muscle cramps, which appear more frequently in the lower extremities and may disturb the patient during the day or night.

We have used many drugs to relieve these cramps (vasodilators, quinine, codeine sulfate, codeine-like analgesics, salicylates, calcium, etc.), but only a few of the patients have responded. In the refractory cases we were successful when a hesperidin–ascorbic acid combination‡ was administered.

In establishing a rationale for the use of hesperidin–ascorbic acid combination as an adjunct in the treatment of poliomyelitis, Boines[6] concluded that the improvement in the integrity of the capillary after administration of the drug resulted in a definite enhancement in the patient's response to the over-all clinical management of poliomyelitis.[7, 8]

We have observed that poliomyelitis patients who were started on the hesperidin–ascorbic acid combination, and who continued taking it throughout their convalescence and rehabilitation program, did not, at any time, complain of muscle cramps. Conversely, patients who interrupted the hesperidin–ascorbic acid medication prematurely complained of moderate to severe muscle cramps. These cramps produced not only pain, but also apprehension and anxiety tension states requiring immediate attention. We postulated that in these patients the integrity of the capillaries was compromised, resulting in the disequilibrium of tissue homeostasis and anoxia of the nerves. Observations of ecchymotic areas and petechiae in the legs in most of the patients confirmed our suspicion that capillary defects were possible etiological factors.

MATERIALS AND METHOD

This study included 19 patients, 12 men and 7 women, ranging from 17 to 38 years of age.

Hesperidin (100 mg.) plus ascorbic acid (100 mg.), in capsules, was prescribed for the muscle cramps. We started each patient on 2 capsules four times daily for eight weeks, and continued after that on 1 capsule four times daily for at least six months in some of the patients and for the full term of observation in the majority.

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‡ The trade name of National Drug Co. for a combination of hesperidin and ascorbic acid is Hesper-C.

RESULTS

Nine patients were under observation and evaluation for four years. Symptoms were controlled in 6 of these within an average of six weeks, and in 3 patients within an average of 10 weeks. They were continued on a maintenance schedule of 4 capsules of the hesperidin–ascorbic acid combination for six months, without any relapse reported. Although these patients were symptom free, they insisted on no interruption of treatment. There were no relapses in any of the patients during the four years of observation and periodic clinical evaluation.

Of 5 patients under observation for three years, all were free of muscle cramps within an average of seven weeks. They continued on a maintenance schedule of 4 capsules of the drug daily for six months. Two patients continued with the treatment for the duration of the observation period. Of the 3 patients who discontinued the drug, 1 had a relapse of leg muscle cramps within three months. Two patients had no further complaints during the three years of observation. The one patient with a recurrence of leg muscle cramps was symptom free again after eight weeks of treatment on a schedule of 8 capsules daily, and remained symptom free on the maintenance schedule over the three years of observation.

Three patients have been under treatment for two years; 1 of these failed to respond to treatment with hesperidin–ascorbic acid. However, the treatment is being continued as an adjunct to other supportive measures.[9]

Two patients have been under observation and repeated evaluation for one year. These patients were symptom free within an average of six weeks. They have continued with the treatment and there have been no relapses.

DISCUSSION

Medical management of paralytic poliomyelitis can be aided by the correction of defects in the capillary system. Tissue homeostasis is possible only in the presence of an intact and normally functioning capillary system via which oxygen and essential nutrients are brought to the tissues and cells and the by-products of muscle activity are removed.

The integrity of the capillary is dependent on the intercellular cement substance. The interendothelial cement provides considerable cover for the endothelial cells facing the capillary lumen. This cement substance, when removed, permits hemorrhage.[10] Increased capillary fragility leading to extravasation may be due to injury of the cement substance or an inability of the endothelial cells to secrete this substance.[11]

The intercellular substance is apparently dependent on the availability and utilization of ascorbic acid or vitamin C. Of the vitamins that control connective tissue, ascorbic acid is outstanding. The role of this vitamin in the production and maintenance of connective tissue has been demonstrated and discussed.[12–14] It has been reported that in the absence of vitamin C, no collagen is laid down, while the fibroblasts show a reduction in phosphatase activity.[15]

According to Youmans,[16] the primary structural change in vitamin C deficiency is a disturbance in the formation and maintenance of the intercellular ground sub-

stance. Apparently ascorbic acid is essential for the integrity of this tissue. The collagen bundles are in the intercellular ground substance. In the absence of a sufficient supply of ascorbic acid, the collagen bundles disappear and the ground substance takes on a thin, "watery" appearance and may eventually disappear.

A striking phenomenon observed with vitamin C, according to Klenner,[17] is the similarity of response, whether in correcting pathological processes due to a deficiency of this compound, acting as a vitamin, or in destroying the ferments of microorganisms, acting as an antibiotic.

That ascorbic acid of itself has no proved effect in combating any condition other than scurvy has been emphasized by Bronte-Stewart.[18] A substance of importance and activity similar to those of ascorbic acid was postulated[19] to accompany vitamin C in nature. This substance was isolated from citrus fruits and Hungarian red pepper as "citrin,"[20] which, on analysis, was found to be a mixture of hesperidin and eriodictyol.[21] The permeability activity of hesperidin was studied by Scarborough,[22] who found that this substance increased capillary resistance in man when given by mouth.

Vitamins, which by definition should be active only in specific deficiency diseases, have been shown to be agents of wide application, capable of acting in a great number of organic dysfunctions not related to avitaminosis. Vitamin P (hesperidin) is no exception to this rule; a deficiency of this vitamin causes, besides alteration in capillary permeability and resistance, pain in the extremities with effort, debility, and lassitude.[23]

It has been suggested by Warter and co-workers[24] that hesperidin is essential for the absorption and retention of vitamin C, acting synergistically in maintaining normal capillary resistance. Selsman and Horoschak[25] suggested, on the basis of their results, that the presence of hesperidin is necessary in the utilization of vitamin C for the intercellular substance. The demonstration of a relationship between hesperidin and ascorbic acid by Beiler and Martin[26] has shed some light on the mechanism involved.

The effectiveness of hesperidin–ascorbic acid as a therapeutic tool to correct abnormal capillary fragility and permeability is adequately documented in medical literature.[27] This combination, as pointed out by Martin,[28] is to be regarded as supplemental therapy in virtually all disease states and specific in action in some.

SUMMARY AND CONCLUSION

Nineteen postparalytic poliomyelitis patients were treated for muscle cramps with hesperidin–ascorbic acid for one to four years. In 15 patients the symptoms were successfully relieved and fully controlled with uninterrupted treatment during the observation period. Three patients stopped medication after six months; 2 of these patients remained symptom free, and the third had a return of muscle cramps within three months but was symptom free again after resuming the medication. One patient failed to respond; however, the drug was continued as an adjunct to other supportive measures.

Hesperidin is essential for the absorption and retention of vitamin C, acting

synergistically in maintaining normal capillary resistance. Hesperidin is also necessary in the utilization of vitamin C for the intercellular cement substance.

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Clinical Experiences with Styramate, a Nonsedative Skeletal Muscle Relaxant

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For many years various drugs, particularly steroids and lately ataraxics, have been used to relieve pain and spasms in neuromuscular skeletal diseases. This report is concerned with the use of a new drug, styramate.§

The need in medical practice for a long-acting, safe, and nonsedative skeletal muscle relaxant has been recognized for many years, particularly since many drugs currently used have undesirable side effects. The active ingredient in styramate is chemically 2-hydroxy-2 phenylethyl carbamate. This drug induces skeletal muscle relaxation by depression of nerve transmission in the spinal cord and brain stem.[1] Specifically, it has been noted that this compound produces neither depression nor excitation nor any of the mood changes common with the use of ataraxics. Extensive animal laboratory studies[1] have shown that styramate does not effect any change in the electrical activity of the cerebral cortex. There were no gross or microscopic pathological changes in organs after a 12-month study nor any hematological dyscrasias. The drug did not influence vital functions such as respiration, heartbeat, gastric secretion, and blood pressure.

Davis et al,[2] in a clinical study, found styramate superior to meprobamate and noted only three mild untoward reactions among 132 patients. Kapland and Mandel[3] used styramate in 200 patients with acute and chronic neuromuscular disorders and found the drug to have great merit and minimal toxic reactions. We have been using styramate for the past nine months among patients with acute and chronic neuromuscular diseases where pain and spasm were prominent symptoms. The results observed with this medicament in 100 patients are the basis of this report.

METHODS AND MATERIAL

One hundred adult patients were treated with styramate in dosages of 200 mg. three or four times daily. Precautions were taken to ensure that patients did not know they were receiving a new drug. The only comment made at the time it was dispensed was that it might be of help. Since we were dealing with a new compound, appropriate studies on blood and urine were performed. Patients were

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§ The trade name of Armour Pharmaceutical Co. for styramate is Sinaxar. The drug was furnished through the courtesy of Dr. Joseph Hubata, Director of Medical Division, Armour Pharmaceutical Co., Chicago.

TABLE I

Effects of Styramate in 65 Patients with Acute Muscular Skeletal Disorders

Diagnosis	No. of cases	Results		
		Pronounced	Partial	None
Sprain (neck, ankle, back)	26	21	5	
Contusions	18	15	3	
Torticollis	6	4	2	
Fibromyositis	6	4	1	1
Bursitis	4		2	2
Neurosis with stress pain	3	2		1
Myalgia with neuritis	2	1		1
	65	47	13	5

specifically questioned about possible side effects and were to report any untoward reactions.

The patients were divided into two groups, those whose symptoms were acute and those whose disease processes were chronic. Patients suffering from mild acute painful skeletal muscular conditions were started on 2 tablets (200 mg.) of the medicament three times daily. Those in whom the disorder appeared to be of moderately severe character were given 200 mg. four times daily.

Twenty of the 35 patients with chronic disease had received previous medication, such as steroids, mephenesin, and meprobamate, but either were not benefited by these drugs or were unable to continue because of undesirable side effects. The various diagnostic categories of patients are shown in table I.

RESPONSE TO THERAPY

Reliable estimates of analgesic relief may be obtained from patients by questioning them after the administration of medication. The results obtained by the use of the drug were judged to be pronounced when the patients became symptom free. Those patients in whom there was diminution of pain were classified as having partial relief. Those who showed no improvement were classified as failures.

It can be readily seen that, of 50 patients suffering from various acute traumatic conditions, 37 (74 per cent) had complete relief of pain and muscle spasm. In most cases the attacks subsided quickly so that the patients were able to continue to work or return to work sooner than expected. Ten (20 per cent) of the patients had incomplete or partial relief from pain, and only 3 patients (6 per cent) failed to respond to the drug and had to be given other medication (analgesics). Thus 47 of 50 patients (94 per cent) responded favorably to the drug and, with the exception of 4 patients, were back to work within five days.

The data in table II show that, after the administration of styramate to 35 patients with a variety of chronic neuromuscular skeletal diseases, 27 patients (77 per cent) showed significant results. These patients had pronounced relief of pain and were

TABLE II

Effects of Styramate in 35 Patients with Chronic Muscular Skeletal Disorders

Diagnosis	No. of cases	Results		
		Pronounced	Partial	None
Osteoarthritis	13	11	1	1
Rheumatoid arthritis	5	2	2	1
Bursitis	3	2	1	
Myofibrositis	4	4		
Osteoporosis (senile) with stress pain	4	2	1	1
Lumbago (back pain)	6	6		
	35	27	5	3

decidedly more comfortable with diminution or disappearance of the muscle spasm and improved mobility. Twenty of these patients had been treated previously with other medicaments without any appreciable subjective or objective improvement. Of the remaining 8 chronic patients, 5 (14½ per cent) experienced partial or fair response; thus there was an over-all satisfactory benefit of 91½ per cent, with 3 patients (8½ per cent) failing to improve with the drug.

UNTOWARD SIDE EFFECTS

We observed no serious reactions to this drug; side effects were mild and few, and none were severe enough to interrupt treatment. The incidence of toxic reactions is summarized in table III.

CONCLUSION

Styramate was evaluated in 100 patients with a variety of acute and chronic muscular conditions who were seen in the outpatient hospital clinic as well as under private care. Our findings indicate that this drug, administered in 200 mg. doses three or four times daily, produced therapeutic response in more than 90 per cent of the patients. The average initial dosage was 200 mg. three times daily in patients whose condition or pain was judged to be mild or moderately severe. Patients with severe trauma or pain, as well as those with chronic conditions that

TABLE III

Untoward Reactions

Reaction	No. of cases
Nausea	2
Weakness	1
Distention of abdomen	1
Total	4

did not respond to previous medication, were advised to take the medicament four times daily. All patients with acute muscular skeletal conditions who had a demonstrable significant response to the medication attained this effect within two to three days. These patients had alleviation of symptoms promptly, with objective diminution of swelling and restored mobility. Among the chronic patients, there was noticeable relief of presenting symptoms after two or three days of therapy. Patients were able to move about more freely, volunteered that their joints were less stiff, and were free and comfortable for longer periods of time.

We found styramate to be a drug of low toxicity and well accepted by almost all our patients. Laboratory studies revealed no urinary or blood abnormalities or evidence of systemic damage.

We feel, on the basis of our study, that styramate has a definite place in the treatment of neuromuscular skeletal disorders. It has marked and prolonged skeletal muscle relaxant properties and is of distinct merit.

ADDENDUM

Having had gratifying results with the use of styramate, we decided to employ this drug in a preliminary trial in combination with analgesics* in the more refractory and severe cases of neuromuscular skeletal diseases where pain was a conspicuous factor. Thus to each tablet of styramate (200 mg.) were added salicylamide (210 mg.), acetophenetidin (150 mg.), and caffeine (30 mg.). The drug was administered to 35 patients in dosages of 1 to 2 tablets four times daily, depending on the severity and response in each individual patient. The analgesic and neuromuscular relaxant effects were confirmed in 27 patients who had satisfactory relief and in the remaining 8 who had partial relief. Two patients complained of bloatedness and nausea. This drug combination, in our opinion, is worthy of more extended clinical trial.

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*The trade name of Armour Pharmaceutical Co. for a combination of styramate and analgesics is Sinaxalate. This combination was furnished through the courtesy of this firm.

FDA Approves Antibiotic Fish Preservative

The U. S. Food and Drug Administration recently authorized the use of chlortetracycline (Aureomycin) as a dip to preserve freshly cleaned fish, scallops, and unpeeled shrimp. The dip is applied just prior to icing and the regulation specifies that the antibiotic in the edible flesh shall not exceed a concentration of 5 p.p.m. when purchased by the consumer. FDA spokesmen say that all fish and seafood processed in this way must be labeled to show the preservative used.

CHLOROQUINE CURES FUNGUS DISEASE. Successful therapy of the refractory fungus infection sporotrichosis with chloroquine (Aralen, Winthrop) was recently reported (J.A.M.A. 158:450, 1959). The infection produces an eruption of subcutaneous abscesses. The drug was administered to a patient and complete regression of the lesions was obtained in about 20 days. Marked improvement was observed in other patients similarly treated, despite the fact that chloroquine had failed to demonstrate in vitro activity against the disease.

HEARTBEAT COUNTER. A heartbeat counter that can be strapped to a patient's chest so that it will record the heartbeat for as long as 24 hours at a time has been developed. The device is small and rugged and contains a transistorized amplifier, a watch movement made into a counter, and a battery. It is connected to two electrodes that are cemented to the chest. The counter was developed by Donald A. Rowley, Seymour Glagov, and Peter Stoner of the University of Chicago in cooperation with engineers of the Illinois Bell Telephone Co.

HYPOLIPEMIC. Indicated as an adjunct in the management of atherosclerosis and other conditions associated with hyperlipemia is a high-potency solution (40,000 U.S.P. units/ml.) of heparin sodium for intramuscular or subcutaneous use (Panheprin 40,000, Abbott). The anticoagulant effects of the drug make it essential to guard against hemorrhage and to treat it actively if it should occur.

LACTIC ACIDOSIS. A condition marked by an abnormal accumulation of lactic acid has been observed in a small number of patients, all of whom were extremely ill and eventually died of the ailment, it was reported at the recent meeting of the American Heart Association. Despite the fact that the patients were at rest in bed with no occasion for exercise, lactic acid levels rose higher than ever noted before and lasted days longer than recorded previously. A widespread failure of oxygen supply to the tissues may be responsible.

GAMMA GLOBULIN. Clinical improvement occurred in approximately one half of a series of 84 children with infectious asthma treated with gamma globulin (J. Allergy 30:439, 1959). The children, all less than 12 years old, were receiving routine treatment but were also given gamma globulin in dosages of 0.5 ml./Kg. of weight every two weeks for

three injections. Three of 4 patients under treatment for one year with low serum gamma globulin were benefited.

INFLUENZA VACCINE. An effective live virus vaccine against two common types of influenza has been developed in the Soviet Union, it was recently reported by a virologist of the Leningrad Institute of Experimental Medicine. The vaccine, sprayed directly into the nose, is now administered to 20 million persons a year in the Soviet Union. It confers an immunity of six months and must be given each year. It is usually administered in October to be effective in January, February, and March, the months in which the disease is most prevalent in Russia.

NEW ORAL ANTICHOLINERGIC. Thirty-six patients with gastrointestinal disorders were treated with oxyphencyclimine hydrochloride (Daricon, Pfizer), a new oral anticholinergic (AM&CT 6:534, 1959). Thirty-four of the 36 patients were benefited by treatment. The average effective dose was 10 mg. every 12 hours. Side effects were few and mild, and no untoward renal or hematological manifestations were noted.

HYPOTHERMIA FOR BACTEREMIC SHOCK. A new therapeutic indication for hypothermia is in treatment of bacteremic shock, reported Abraham T. Cockett and Willard E. Goodwin (Los Angeles). Complete recovery was achieved in 10 of 11 cases by lowering rectal temperatures to 90 to 97 F. In all cases hypothermia was used as an adjunct to standard treatment methods. Five of the patients were "dramatically improved" within 24 hours. Maximum period of hypothermia was 48 hours.

ANTIANXIETY AGENT. Released recently was a highly potent new phenothiazine derivative, fluphenazine dihydrochloride (Permitil, White), reported to be effective against anxiety disorders at extremely low dosages. Onset of action is rapid and the long duration of effect makes possible a convenient schedule of morning and evening dosage. Side effects at recommended dosages are infrequent; the drug is contraindicated in severely depressed states.

SEAWEED EXTRACT IN TREATMENT OF PEPTIC ULCERS. Carrageenin, a sulfated polysaccharide that composes 60 to 70 per cent of dried seaweed, has given encouraging results in treatment of peptic ulcers, it was reported before the recent meeting of the Division of Medicinal Chemistry of the American Chemical Society. Carrageenin apparently interferes with the development of ulcers by blocking the action of pepsin, it was found in animal experiments. Clinical trials have not been completed, but the preliminary results are reported to be encouraging.

A Clinical Evaluation of Vastran

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It is well recognized that local ischemia and consequent anoxia may precipitate a wide variety of physical or mental symptoms. Many reports[1–6] have shown that these same disorders frequently are the result of faulty metabolism and that they respond to administration of nutritional factors given in amounts larger than the normal requirements, in order to stimulate the resumption of normal metabolic function.

In the treatment of peripheral vascular diseases, for example, it is of great importance to induce a vasodilation within the affected areas. In such vascular conditions, the flow of blood may be impaired because of vasospasm, venostasis, or arterial obstruction. Vasomotor spasm may be counteracted by temporary chemical blockade, by permanent denervation (sympathectomy), or, more simply, by the administration of vasodilating drugs. However, many of the vasodilating drugs cause not only peripheral but systemic vasodilation as well, so that the blood flow to the peripheral vascular bed, and particularly to the skin, actually may be diminished.

Nicotinic acid, credited as being one of the most effective vasodilators,[7] exerts a peripheral action mainly in the blush areas of the face, head, and neck and in the vascular bed of the extremities.

Because of its localized vasodilating action, nicotinic acid is particularly suited for therapy of peripheral vascular diseases of these areas, especially when it is used jointly with relatively large quantities of coenzyme factors to combat nutritional deficiencies of cellular metabolism within the vascular walls and surrounding tissues where onset of necrotic changes has appeared or is imminent. Such a formulation, containing these factors, is available as Vastran* tablets.

The literature on the pharmacology of nicotinic acid is extensive. One pharmacodynamic effect is outstanding; namely, nicotinic acid's effect on the blood vessels. It has pronounced vasodilator action, affecting the peripheral blood vessels and apparently also the cerebral and spinal vessels. Its effect on the cutaneous vessels causes a characteristic flush, which lasts approximately two hours. Despite its vasodilating effect, it has been found to have very little influence on blood pressure, pulse, or body temperature.[8] Nicotinic acid has been found to be quite nontoxic, the ratio between the effective therapeutic dose and the toxic dose being at least 1: 1000.[8]

In addition to nicotinic acid, other members of the B complex—thiamine, ribo-

* The trade name of Wampole Laboratories for a formulation containing nicotinic acid and coenzyme factors is Vastran tablets. Each tablet contains nicotinic acid, 50 mg.; ascorbic acid, 100 mg.; riboflavin, 5 mg.; thiamine mononitrate, 10 mg.; pyridoxine hydrochloride, 1 mg.; vitamin B_{12}, 2 μg.; calcium pantothenate, 5 mg. The drug was supplied for this study by Wampole Laboratories.

flavin, pantothenic acid, and pyridoxine—as well as ascorbic acid, appear to act as coenzymes in biological oxidation and reduction processes. Although the exact *modus operandi* has not been completely determined, we do know that metabolism cannot continue without the cooperation of a whole group of coenzyme factors, while it can be disrupted for the lack of any one. Pollack and Halpern[9] have written, " . . . it is important to remember that the vitamins must be considered, not as independent nutrients, but as actual participants in metabolic reactions. Disease or tissue injury may cause a break in the chain of reactions yielding the energy required for the formation of coenzymes. Thus it is conceivable that, in spite of a normal amount of vitamins, the actually functioning coenzymes would not be synthesized."

In an attempt to evaluate clinically the effect of Vastran tablets, they were administered to 53 patients with five different pathological entities. In this group, there were 31 white women and 22 white men, ranging in age from 18 to 81 years. They were treated either in hospitals, nursing homes, or as office outpatients. For standardization, they were classified as follows: vascular diseases: peripheral vascular, cerebral thrombosis, vascular, etc., headaches; rheumatic, muscle, and joint pain: arthritis, bursitis; neurological diseases: peripheral neuritis, herpes zoster, multiple sclerosis; skin diseases: psoriasis; asthma.

The following clinical abstracts describe further details of diagnosis, treatment, and results:

Vascular Disease (19 Patients).

Peripheral Vascular Disease. M. D., a 67-year-old white woman, with chronic varicose ulcerations of the legs for which the saphenous vein and tributaries had been twice ligated, developed another ulcer after trauma. She had little improvement with elevation of the legs and saline applications. Vastran tablets, before meals and at bedtime, were added to this regime, and definite improvement was noted within a week.

G. S., a 68-year-old white man, and his brother-in-law, E. D., a 60-year-old white man, had intermittent claudication after walking short distances or even after long periods of standing. Since it was necessary for them to stand for hours in front of steel furnaces, their "leg cramps" practically forced them to stop working. G. S. was treated first with Vastran tablets, four times daily, and Vastran AMP* injections, twice weekly. After two weeks of therapy, his legs felt better and he was able to return to work. E. D. was started on therapy two weeks later with similar good results.

L. D., an 80-year-old white woman, and Y. K., a 74-year-old white woman, had typical cases of arteriosclerotic vascular disease. Both patients had pains in their legs, cold extremities, and were unable to walk except for very short distances. There were also signs of impaired cerebral circulation, such as impaired memory, etc. L. D. also had advanced arthritis of multiple joints, while Y. K. had rheumatic heart disease, compensated. A history of probable inadequate diet in both cases was reported. Each patient received intramuscular Vastran AMP,

* Vastran AMP contains adenosine 5-monophosphate, 25 mg.; nicotinic acid, 20 mg.; vitamin B_{12}, 75 μg.

1 cc., every other day, and Vastran tablets, four times daily, for five weeks. Within three weeks, improvement was noted, both subjectively and objectively. Both patients had a definite feeling of well-being; they had less pains, walked better, had improved appetite, and seemed more alert.

E. L., a 49-year-old white woman, was known to have had Raynaud's disease involving her hands for about 15 years. She had conventional therapy with moderate improvement, but she still had acute attacks, especially during cold weather. Vastran, 1 tablet four times daily, and Vastran AMP, 1 cc. every other day, were first administered in December, 1957. The tablets have been continued but the injections were stopped after a month. During the first winter of drug administration, she had only one attack, in December. Her hands felt "looser," and she was able to take care of her household duties.

Cerebral Thrombosis. This group included 5 female and 2 male patients, ranging in age from 69 to 81 years. These patients all had had attacks of acute cerebral thrombosis, secondary to arteriosclerotic vascular disease. M. W. also had a fractured left hip, which had been pinned. V. M. had carcinoma of the prostate, for which bilateral orchidectomy had been performed four years previously; he was on stilbestrol therapy. K. K. had pernicious anemia, for which she was receiving specific therapy.

About 24 hours after acute symptoms appeared, all were given Vastran AMP, 1 cc. daily, and tablets, four times daily. M. D. had a stellate ganglion block, with a resultant Horner's syndrome. This apparently hastened her recovery. The most important finding in these 7 patients was the rapid improvement of hemiplegia and the lack of any residual weakness within three months after the stroke. In a large percentage of other patients with acute cerebral thrombosis, there is a residual hemiplegia or speech defect. An improved mental picture, almost approaching euphoria, was generally seen.

Vascular Headaches. The use of Vastran in cases of vascular tension or migraine headache is of definite value. Five of the 6 women in this group were improved; only 1 patient with severe migraine showed no response. Two of these patients, 1 with hypertension and the other, an emotionally disturbed nurse, had marked relief, and on maintenance therapy, they have remained free of headaches for the past two months. Prior to Vastran therapy, they had at least one or two headaches each week.

Rheumatic, Muscle, and Joint Pain (11 Patients).

Hypertrophic Arthritis. Six patients with hypertrophic arthritis were treated with Vastran, four times daily. Two of these showed moderate improvement, while four showed no effect. All had bone changes of long standing. It is of interest to note that of the 2 who improved, one was a 34-year-old white woman, C. C., and the other, a 46-year-old white man, R. C.—while the other four averaged 68 years in age and had been affected for 10 to 25 years.

Bursitis. Today, the treatment of subdeltoid bursitis is divided between radiological therapy and steroids, either locally or systemically. Five patients were given Vastran AMP and tablets, without the other therapy, for one week, without any improvement. Four other patients were given Vastran therapy and steroids,

and four received Vastran with radiology. The beneficial effects in these two groups were the same as in controls receiving steroids or radiological therapy alone.

Neurological Diseases (14 Patients).

Peripheral Neuritis. There were 8 patients in this study with neuritis secondary to isoniazid therapy for inadequate diet. Peripheral neuritis is a rather frequent complication of antituberculous therapy. All showed definite improvement on the Vastran regime. One patient with tabes dorsalis had no response to Vastran therapy, and 1 man with trigeminal neuritis was not benefited.

Herpes Zoster. Two patients were treated, 1 shortly after symptoms began and the other, three weeks after onset of the rash. H. H., a 35-year-old white woman, was seen with acute herpes zoster 24 hours after the pain and rash were first noticed. On a regime of Vastran AMP and Vastran tablets, four times daily, the vesicles dried, and pain was completely gone by the fourth day. M. D., a 76-year-old white woman, with herpes zoster diagnosed three weeks before I saw her, had little relief of pain, although the vesicles disappeared.

Multiple Sclerosis. This has proved resistant to all forms of treatment with the drug to date. In 2 proved cases, M.D., a 52-year-old white woman, and V. W., a 29-year-old white woman, Vastran AMP and tablets were given for six weeks. Although both patients had the flush reaction and seemed generally better, the multiple sclerosis was unchanged.

Skin Diseases (2 Patients). Two patients with chronic psoriasis had little change in the skin lesions after four weeks of treatment with Vastran. However, both reported "feeling better."

Asthma (7 Patients). Although it was difficult to evaluate the specific effect of Vastran in 7 patients with allergic asthma, the drug did seem to be of value. These patients did not require as much antihistamine as previously and had fewer attacks.

SUMMARY AND CONCLUSIONS

It becomes evident, in evaluating peripheral vascular diseases, that many symptoms are secondary to locally diminished blood supply, resulting in tissue hypoxia and attending deprivation of coenzyme factors necessary for energy transfer in normal tissue metabolism. In opposition thereto, peripheral vasodilation reduces the vascular resistance and promotes return of normal blood supply. Coenzyme factors supplied simultaneously with restored oxygen supply combat deficient tissue metabolism and promote healing of degenerating tissue. Thus the progress of necrosis is often prevented.

In this series, it was observed that 18 of 19 patients with vascular diseases were improved under the therapeutic regimen. The improved mental response in the elderly patients was marked. Although there was some improvement in the "rheumatic" group of patients, it was less marked. Vastran proved of little value in the treatment of bursitis.

Among the 14 neurological patients, those having peripheral neuritis showed marked improvement. However, the symptoms of tabes, trigeminal neuritis, and multiple sclerosis were not affected.

Two patients with psoriasis had no change, while 7 patients with allergic bronchial asthma benefited by Vastran. The decreased need for antihistamines may be due to a potentiating effect of the vitamins.

In conclusion, these results confirm the value of Vastran tablets as an effective vasodilator and metabolic stimulant. It is most effective in the treatment of peripheral and cerebral vascular diseases and the neuropathies and to improve the impaired faculties of the geriatric patient.

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"Hazardous Substances Act" Before Congress

A Hazardous Substances Act has been submitted to Congress by Representative Thomas Curtis of Missouri with strong backing from the American Medical Association's Committee on Toxicology. The new law is designed to cut down the growing number of accidental poisonings in the home caused by infants and children swallowing toxic substances, such as cleansers, detergents, polishes, deodorants, and similar substances, which have become common household articles. The proposal, if approved, will require distinctive labeling for all such substances, which are exempt from present laws, prohibit reuse of food and drug containers unless original labels are removed, and require conspicuous warnings for all chemicals that are strong sensitizers on contact with human tissues. The present law, according to U. S. Food and Drug Administration officials, gives the FDA jurisdiction over drugs but not household products, many of which cause accidental poisoning each year.

Cephalic Version—Diagnosed from a Free Dream

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Freud claimed that "all anxiety goes back originally to the anxiety of birth." If this is true, it should be possible to reconstruct the story of delivery from pertinent dreams. However, once a patient knows the approach of the analyst, he may obligingly build his dream life on what is anticipated of him or on whatever he likes to fantasy. To avoid such unconscious compliance, we need a free dream. It should be from someone who is not under analysis and who knows nothing of dream symbolism or interpretation. If possible also, the dreamer should be a stranger to the analyst, unsuspecting of the scrutiny to which his dream would be subjected.

Many years ago, in one particular instance, it was my good fortune to find all these conditions fulfilled. After a lecture before a group, I was approached by a woman whom I had never met before. She said that a friend of hers had wanted to attend my lecture but was unable to. He had asked her to hand me a dream of his 16-year-old son, which I might be interested in studying and analyzing.

I recalled that two or three years previously I had met the father casually. My recollection of him was vague but sufficient to identify him. However, I knew nothing about him and did not know he had a son. I asked for the dream and was handed the original letter of the son to his father (which is still in my possession) and I quote from it:

"You [the father] and I were standing on the porch of a cabin in a place I had never seen before. It was summer and we were watching an airplane circle over our cabin. It started to land in a clearing nearby, but the pilot merely ran the wheels along the ground and then took off again. He circled and then began to repeat the landing and the take-off. This time he could not get the airplane off the ground. He was going too fast to avoid hitting a fence and a tree, which tore the right wing off the airplane and swerved it around so that the nose of the plane hit the tree. This completely wrecked the plane, but the pilot was not hurt. He climbed out of the cockpit and came toward our cabin.

"When he reached the cabin, he came in and sat down, but did not speak. You became suspicious of him and took a pencil and paper and began to write a description of him. I was sitting in your lap and you repeated into my ear whatever you were writing. The pilot had no left arm, in its place a small hand protruded directly from his shoulder. A wide red scar ran from his chin across the cheek through the center of the ear and then to the middle of his head at the back. Where the scar crossed the ear, the ear was flat against the head, while the top and bottom of the ear stood away from the head normally.

"I don't remember much else, except that the pilot kept looking from the porch as if he expected to see someone he knew. He grew more nervous as you wrote, and then I woke up.

"This was a vivid and peculiar dream."

I told the woman that her friend was asking a good deal for an analysis in absence

of associations and knowledge of the dreamer, but that I would try to analyze the dream, as it had some highly unusual features.

After due reflection, I wrote to the father that if I failed in my analysis he should not blame dream interpretation for the failure. Then I continued:

"My first impression of the dream was that at about the age of 2, your son had a terrible accident in which his face was injured. Subsequently, this impression yielded to the growing belief that he was speaking of his birth by cephalic version —that he had been about to present feet first, but was turned back by instruments, and in the course of delivery his head was severely bruised. Furthermore, you were not only a father but also a mother in this boy's life. Perhaps you can explain how this could have come about."

The boy's father replied:

"You were very close to the truth as far as you went. My son was not injured in the face at the age of 2. But—and this is amazing—he did present feet first and had to be turned. I was told that special instruments were called for at his delivery.

"When he was 5 years old, his mother had to leave our home because of tuberculosis. She was away for a year and a half, returned and stayed for about six months, and then had to go away again. Since that time she has seen the boy about three times and has done little to maintain contact with him. My sister and I raised him. He is 16 now, having been born Dec. 12, 1926. He is in Kingston, New York, and I am with him on weekends. During the summer, I am with him each day, as we live at my camp near him. I have done everything possible to keep close contact with him. During the period of the year when I see him at weekends only, I write him a letter each day. Every weekend I tell him about the interesting things I have done in New York. So I believe I can qualify as father and mother to the boy."

The letter was so encouraging that when I again communicated with the father, I gave him the grounds on which I based my guesses as to the meaning of his son's dream. I wrote:

"Neither your boy's letter nor yours tells into which ear you were whispering in the dream and whether this was the same ear over which the scar ran. Your son should be able to shed light on this. I would guess it was the same ear. If not, I would consider it possible that his power of hearing differs in the two ears and is much keener in the one into which you whispered than in the other, or it may be that the boy suffers only some discomfort in one ear, which could be a psychological after effect of his birth trauma.

"Now as to how I reached my startling conclusion about his birth:

"The pilot had no left arm, but in its place a small hand stuck out straight from his shoulder. This was observed at the cabin when Bert was sitting in your lap. This very small hand seemed to be a baby's hand. If your boy had come to see me, I would have asked him: how old do you think the baby, to whom the hand belonged, could have been? In his absence, I answered the question myself and assumed he would have said: about 2 years old. I arrived at this conclusion because the airplane made two attempts to land. Every dream has a hidden date. The dream mind, in reviewing the past, evaluates the time separating the present from the past. While a 2-year-old child may not be aware of his age, in retrospect a 16-year-old boy's

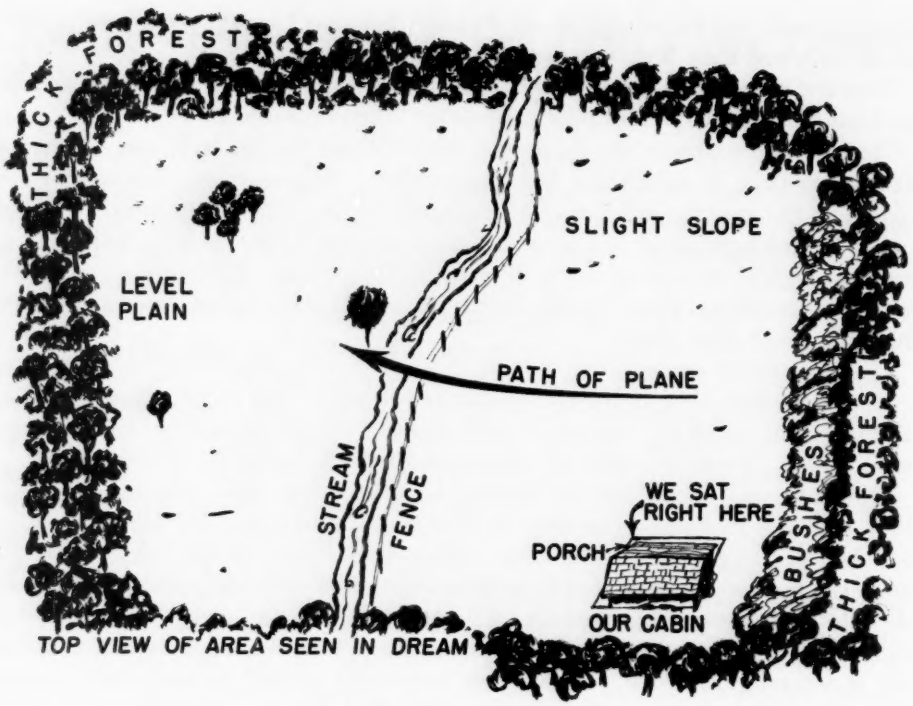

FIG. 1. Sketch of the area seen in the dream.

dream is well able to give this information. It would have followed that the accident of which the nightmare speaks happened at the age of 2 and that the dreamer had retained no conscious memory of it. The total amnesia seemed to be indicated by the fact that you described the pilot and you whispered into Bert's ear. You did all the talking; he just listened, and the pilot himself was mute.

"Then I looked at the sketch that your son sent along with the dream [fig. 1] and gave up the idea that he had been in an accident at the age of 2. The sketch is very vivid. It shows a stream beyond the fence and the tree is across this stream. Your son made no mention of this stream in the dream narrative, nor did he place sufficient emphasis on the thickness of the forest all around.

"A thick forest may represent the unconscious, but here there was also a clearing, a descent from the sky, running water, a fence, a tree, and a cabin in a corner. It seemed to me that the landscape symbolized anatomical features, that the bushes referred to genital hair, the fence to the pelvic arch, the stream to the amniotic fluid, the tree to the tree of life, and the cockpit to the womb. The airplane would then represent descending life. At first it failed to make a landing and a second attempt followed. In this second attempt, it crashed into the fence. The circling and the return suggested the turning of the body, and the nose of the plane hitting the tree, the injury in delivery. The destruction of the right wing seemed to refer to the shattering effect of the injury. (Incidentally, this would indicate that if the right

side of the face was the side injured, the ear in question was the right one.) The absence of a wound in the pilot indicated that the injury was caused by a shock.

"Then I asked myself: why did the dreamer depict summer when he was born in December? I think the answer is that he combined two impressions in the dream: the memory of a safe and secure position with his father at a later age (summer standing for warmth and comfort) and the memory of his prenatal position in the womb. The cabin is another symbol of the womb, but note that he was outside on the porch, which suggests (just as the lap does) completed delivery from the father-mother. As there was no reference to a woman, I assumed that you had filled the role of both mother and father.

"The pilot was speechless because at birth we are speechless. Yet you were in a position to know what had happened, so it was you who gave a description and who was acquainting the boy with the secret behind the arrival of the pilot. The flattened part of the ear plainly suggests the pressure of an instrument. It is not impossible that your son may feel a pressure occasionally in the right ear. It may disappear on his becoming conscious of this.

"This is about all, except that the complete wrecking of the plane may hint at the injury Bert's mother had suffered in delivery, as the plane could refer to her body also. She must have been badly torn, and as a result, your boy may show signs of Groddeck's blood guilt to the mother, particularly if he was told of the severity of her suffering at the time of his birth. Unconsciously, he may hold himself responsible for her sufferings, even for her tuberculosis, which is a dreadful burden to carry. This guilt of shedding the mother's blood is, of course, fantastic, but it can be dissipated by analytic education."

After the receipt of my letter, the father had an interview with his son, and wrote again:

"The ear was the right one. There is no difference in acuteness of hearing between the right and left ear, but my son had a double mastoid when he was 5 months old and both his eardrums were punctured. The hand suggested to him a baby between 1 and 2 years of age; the forest was heavy and the trees were tall. He has no feelings of regret regarding his mother."

All in all, my interpretation of the dream, without contact with the dreamer, was fairly successful. The only weak point is that the dream was not as free as I believed at first. The father had attended some of my earlier lectures and presumably had told the boy of my interest in the trauma of birth. Since the father intended to come to another lecture of mine, he may well have activated thoughts about the trauma of birth in his son's memories, as the father freely discussed with the son everything that he did or intended doing. But—and this is important—the boy did not dream for me. My lecture and the intention of his father to attend another could not have been more than a day remnant for the boy, and it is on day remnants that dreams are usually built. Without such a day remnant, the dream and its timely communication to me would have been a coincidence of disturbing proportions.

Needless to say, I do not encourage my method of analyzing the dream without the patient for wide application. I performed, more or less, a stunt and to do it I

had to take courage. The general conclusions that I drew could easily have been wrong. The airplane is not a universal symbol of descending life; it may stand, more probably, for a host of other things. It was only a weaving of all the tangled threads of the dream that suggested to me the trauma of birth.

As to how a neonate's unconscious (which we must assume as already existing) is capable of taking up the shock of birth and sending it on in a dream in dramatic detail at a comparatively late age, I have no answer. We know how sensory experiences may feed the unconscious, but concerning its real nature and its relationship to the organizer of the biologists (the dynamic agent that supervises embryonic development), we know as yet surprisingly little.

SYMPOSIUM ON MEDICINE AND WRITING

The Symposium on Medicine and Writing that appeared in the November 1956 issue of INTERNATIONAL RECORD OF MEDICINE has been published recently as a Monograph. The articles included in this Monograph are: "The Editing of a Modern Medical Textbook" by Russell L. Cecil; "Plain Talk and Clear Writing" by Morris Fishbein; "The Principles of Bibliographic Citation" by John F. Fulton; "The Art of Communication" by Joseph Garland; "On Writing a History of Medicine" by Douglas Guthrie; and "Minerva and Aesculapius: The Physician as Writer" by Félix Martí-Ibáñez.

This 72-page Monograph is sold for $3.00. As the fourth in the series of MD International Symposia, this book is the companion piece of *Medical Writing*, which was published in May 1956.

To obtain this monograph, write to MD Publications, Inc., 30 East 60th Street, New York 22, N. Y.

The Diagnosis and Treatment of Hemophilia and Hemophilia-like Conditions

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In the past, hemophilia was regarded as a well-defined clinical entity caused by a specific defect in coagulation. Recent studies have altered these views and shown that diseases produced by various basic defects in the coagulation mechanism can cause similar clinical manifestations. The term "hemophilia," instead of defining a clinical disease entity, refers in fact to a syndrome. This has greatly simplified many observations that were not understandable in a single disease.

About 85 per cent of hemophiliac diseases are caused by true hemophilia, or, as it is sometimes called, hemophilia A. The basic defect is the absence from hemophiliac blood of a globulin present in plasma known as antihemophilic globulin.[1] After contact with any foreign matter, antihemophilic globulin reacts with other coagulation factors to form a substance that disintegrates blood platelets and increases the activity of the conversion of prothrombin to thrombin. A deficiency of antihemophilic globulin will therefore increase the time required for these initial changes and delay the clotting of the blood by reducing the amount of thromboplastin formed.[2]

The incidence of true hemophilia is about 2 to 3/100,000. It is inherited as a sex-linked recessive, transmitted to affected male offspring by their mothers, who themselves exhibit no hemorrhagic tendency. It is therefore found almost exclusively in boys and men. Hemophiliac men do not transmit this defect to their sons, but to their daughters, who become potential transmitters. The children of a female transmitter have an equal chance of being normal or of being transmitters, if girls, or hemophiliacs, if boys. Since female transmitters are usually heterozygous, they do not exhibit any bleeding abnormality. However, if a hemophiliac man married a female transmitter, homozygous female offspring might be produced who could show hemophilia.[3, 4] While in most instances a familial history can be obtained, occasionally (stated to be as high as 25 per cent[5]) no previous family history can be found. These isolated cases in no way differ from the hereditary ones and are no doubt due to mutations, rather than a sporadic state.

The hemorrhagic tendency appears by the end of the first year. It is unusual to see it before then because of lack of trauma or early variations in the quantity of antihemophilic globulin. Bleeding occurs from the external surfaces of the body, i.e., the nose and mouth, and from the gastrointestinal tract, urinary system, central nervous system, and joints. Bleeding may continue for days. Bleeding into the tissues may cause hematomas, with serious pressure effects; bleeding into the tissues of the mouth or neck may cause asphyxia; bleeding into the joints may cause pain, swelling, and crippling.

Morphologically hemophiliac blood is normal unless severe bleeding has caused

an anemia. The bleeding time may occasionally be prolonged, and the clot retraction is difficult to measure but is usually normal. The coagulation time is greatly prolonged and, while varying from patient to patient, tends to remain fairly constant for each individual. In testing with the simple Lee-White determination or by the Rudolph capillary tube method, the clotting time will be more than 10 minutes (normal 5 to 10 minutes). It is usually between 20 and 60 minutes at the time of hemorrhage. Most hemophiliac patients will coagulate satisfactorily at 20 minutes or in a longer time than normal persons. However, it must be remembered that while there is a rough correlation between coagulation time of the blood and severity of the hemorrhage, a shorter clotting time does not mean that the patient is only mildly affected and does have prognostic significance.[6]

The thromboplastin generation test gives abnormal results, and the amount of thromboplastin formed will show a relationship to the severity of the condition. This test is more useful in a modified form showing a quantitative estimate of the antihemophilic globulin in a given patient.[7] Expressed in percentage of normal blood, 1 ml. of normal plasma contains 0.25 antihemophilic globulin units. Hemophilic levels of antihemophilic globulin will vary between 0 and 20 per cent. In severe cases there is no measurable antihemophilic globulin; in moderate cases, up to 5 per cent; and in mild cases, between 5 and 20 per cent.

Other tests are not of value in diagnosis but are important in obtaining the degree of coagulation activity. The prothrombin consumption test shows large amounts of unconsumed prothrombin but is not specific for hemophilia, as all defects of thromboplastin formation will be similar. This is also true of thrombin generation. Thrombin formation may be reduced or undetectable but will occur in any deficiency of thromboplastic factors. The prothrombin time is normal by both the one-stage and two-stage methods in hemophilia and also in plasma thromboplastic component and plasma thromboplastic antecedent deficiency.

Plasma thromboplastic component deficiency, sometimes called Christmas disease, occurs in about 10 per cent of cases of the hemophilia syndrome. Like hemophilia, it is inherited as a sex-linked recessive. In about 25 per cent of cases, no family history can be obtained. It has been stated[8] that mildly affected female offspring may result, as the gene may not be completely recessive. The clinical symptoms are quite like those of hemophilia, with bleeding occurring from all areas. Hemarthrosis also occurs eventually.

The laboratory findings are also similar. While it is said that the coagulation time is not as prolonged as in hemophilia, rarely being more than 30 minutes, I have found no difference. The thromboplastin generation test locates the abnormality in the serum instead of in the plasma, as in hemophilia. Furthermore the plasma thromboplastic component is stable and is not all consumed during coagulation. It is also absorbed by barium sulfate.

Plasma thromboplastic antecedent deficiency, also called Rosenthal's syndrome, is the least frequent of these disorders. It is familial, non-sex linked, and affects both male and female offspring, due to a dominant inheritance.[9] Clinically it is not as severe as hemophilia and causes no hemarthrosis. It causes prolonged bleeding after tonsillectomy or a tooth extraction.

The laboratory findings include moderate prolongation of the coagulation time and deficient prothrombin consumption. Plasma thromboplastic antecedent is stable on storage. The disease is distinguished from hemophilia and plasma thromboplastic component deficiency in that hemophiliac blood is corrected by fresh barium sulfate plasma and not by serum, plasma thromboplastic component deficiency is corrected by serum and not by barium sulfate plasma, and plasma thromboplastic antecedent deficiency is corrected by both barium sulfate plasma and serum.

Factor V deficiency, or plasma accelerator globulin deficiency, is also known as parahemophilia and Owren's disease. It is also uncommon. It may be familial or sporadic, occurs in male and female offspring, and has been found in liver diseases, leukemia, advanced carcinoma, and postoperatively.[10] Bleeding is not so severe, consisting usually of epistaxis and ecchymosis. There is no hemarthrosis. The blood shows an increased coagulation time, with a long one-stage prothrombin time. The two-stage prothrombin time is relatively normal. This distinguishes the disease from hemophilia and plasma thromboplastic component and antecedent deficiencies. Factor V disappears rapidly in stored blood.

Factor VII deficiency, or serum prothrombin conversion accelerator deficiency, is also uncommon. It can cause serious bleeding from the gastrointestinal tract and kidneys, into the skin, and hemarthrosis. It is familial, not sex linked, and is found after treatment with the coumarin drugs and in hemorrhagic disease of the newborn infant (prothrombin deficiency). There is a prolonged coagulation time and a prolonged one-stage prothrombin time, with a less prolonged two-stage time. The disease can be distinguished from factor V deficiency by removal of factor VII from plasma by barium sulfate. Factor VII is also stable and is present in bank blood and plasma.

There are also some uncommon factors, such as the Hageman factor, which does not produce any clinical symptoms but causes an increased coagulation time, with deficient prothrombin consumption. The Stewart factor causes very mild symptoms, reduction of both the one- and two-stage prothrombin times, and vascular purpura with antihemophilic globulin deficiency. The disease is found in both sexes. The symptoms are similar to those of hemophilia, with an increased coagulation time and deficient prothrombin consumption. The blood will also show an increased bleeding time and give a positive Rumpel-Leede test.

The diagnosis of the hemophilia-like disturbances can be made first by a careful history. While the condition may not be apparent until after the first year of life, there will be a clear history of uncontrolled hemorrhages from various parts of the body. The majority of these disturbances are familial. Limitation to male relatives on the mother's side strongly suggests either hemophilia or plasma thromboplastic component deficiency. However, it must be remembered that occasionally there will be no family history.

The characteristic coagulation tests will also serve to differentiate the hemophilia-like disturbances. The platelet count, bleeding time, and tourniquet test are normal and will serve to eliminate thrombocytopenia and the vascular purpuras. The prothrombin consumption test is prolonged, but will occur in any of the disorders of thromboplastin formation and is not specific for any one. The one-stage prothrombin

time is normal in hemophilia and plasma thromboplastic component and antecedent deficiencies but is prolonged in deficiency of factor V, VII, prothrombin, and fibrinogen. In prothrombin deficiency there will be a reduced two-stage prothrombin time, and fibrinogenemia can be distinguished by paper electrophoresis. Factor V and VII deficiencies can be distinguished by the removal of factor VII from plasma by barium sulfate, and the thromboplastin generation test will differentiate hemophilia and plasma thromboplastic component and antecedent deficiencies. Also, hemophiliac blood will be clotted only by fresh blood or plasma, while plasma thromboplastic component and antecedent blood will be coagulated by aged blood (bank) or serum. The latter two can be differentiated in that plasma thromboplastic component is absorbed by barium sulfate and plasma thromboplastic antecedent is not. Antihemophilic globulin assay is seldom required for diagnostic purposes but may be useful in estimating the prognosis in a case of hemophilia.

There are a number of other diseases that simulate the coagulation disturbances and must be differentiated. These are leukemias, which frequently show scattered bleeding initially. Bone marrow examination will show a preponderance of one type of cell. Aplastic anemia may occasionally show bleeding. Here there is marked anemia and the bone marrow is hypoplastic. Acquired hemolytic anemia may show bleeding, but there is anemia with increased blood bilirubin. Chronic bleeding from the bowel may be mistaken for coagulation disturbance. There may be anemia, but the coagulation time and other factors are normal. These diseases are usually due to chronic colitis, polyps, Meckel's diverticulum, ulcer, or Henoch's purpura.

The prognosis of the hemophilia-like disturbances cannot be definitely determined until after the first years of life or until the stress of outside existence with injuries can be assessed. If these bleeding episodes are frequently repeated, the prognosis may be crippling with disability. Unless extreme care is taken, death may result before the child becomes an adult. There seems to be a liability not only for hemorrhage but also for infections. In hemophilia, estimation of the antihemophilic globulin blood level is valuable, as less than 5 per cent of patients have a poor prognosis. Plasma thromboplastic component and factor VII deficiencies are both usually severe. The other diseases are much less severe, and abnormal bleeding will occur only after severe trauma or surgical operations. Otherwise the subject is capable of leading a normal life. The more severe diseases will make a normal life impossible, and some special sheltered occupation is necessary to prolong the patient's life. There is no reliable method by which a female carrier of the hemophiliac gene can be recognized. Inasmuch as daughters of hemophiliac men have an equal chance of being normal or of bearing transmitters, if girls, or hemophiliacs, if boys, they should not produce families.

The treatment of all of these conditions may be considered in three groups. The first, similar for all, is local treatment. The essential principle here is that a suitable coagulant be applied with temporary local pressure to arrest blood flow and allow time for the formation of a firm clot. This may be induced by absorbable dressings, which should be kept firmly in place, avoiding anything that might devitalize or damage the tissues. The only coagulants that are of any value are Russell's viper venom and thrombin. The clot must extend to the bleeding vessels to arrest the flow

of blood. This can be accomplished by local pressure exerted for about five minutes and then slowly relaxed. The clot is then left absolutely alone until dissolved or dislodged. It may often be necessary to repeat this procedure.

Surface wounds may require the suturing of torn blood vessels; otherwise suturing should be avoided as the bleeding will then be from minute vessels, which will make hematoma formation worse. Adequate drainage should be provided, and the skin edges should be drawn together with tape and the wound packed with absorbable gauze and coagulant. A firm dressing is best held by an elastic bandage.

Bleeding into the tissues is interstitial, and the blood infiltrates the tissue spaces and never localizes. It is therefore useless and dangerous to incise or aspirate hematomas. Hemorrhages about the tongue or throat may cause enough pressure to require intubation. Retroperitoneal hemorrhage will simulate appendicitis or perforated ulcer. Hemarthrosis is best treated by orthopedic splinting and aspiration; lavage with hyaluronidase or other coagulants may not only cause infection but promote further bleeding. Hematuria may appear alarming, but actually very little blood is lost. In all of these very severe episodes, transfusions will probably be used, but even with these, the bleeding may continue for days or weeks and then suddenly stop, for no apparent reason, just as suddenly as it began.

Hemophiliac persons notoriously have bad teeth so that the problem of extraction frequently arises. This can be a serious procedure and should be done in a hospital with a general anesthetic. Great care should be taken to avoid tissue damage. The socket should be packed with fibrin foam, held firmly in place for five minutes. A dental splint is then applied to keep the dressing in place, and the clot is left alone. Sometimes it is necessary to transfuse with fresh blood. A very simple method, devised by Birch and Snider,[11] is to place an elastic band on the tooth to be extracted. The band moves toward the root, forcing the tooth up and out. The blood vessels are stretched until their lumen is obliterated. This may take some weeks but it results in a clean denudation of the root to its complete expulsion without the loss of any blood.

The general treatment of hemophilia at the present time can only be concerned with correction of the clotting defect in the patient as an emergency measure in a current hemorrhagic episode or after an injury or operation. This of course is concerned with the antihemophilic globulin level in the patient. Those with a level between 10 and 20 per cent may bleed abnormally even though the coagulation time and prothrombin consumption tests give results close to normal. It is only when the antihemophilic globulin level falls below 10 per cent that these tests become prolonged. It is for this reason that we must endeavor to promote coagulation of the blood, rather than to influence the coagulation time as a test. It would be necessary to transfuse the average adult with 1½ liters of plasma or 3 liters of whole blood to raise the antihemophilic globulin blood level by 35 per cent.[7]

It is very difficult therefore in actual bleeding to provide enough antihemophilic globulin to promote efficient hemostasis. The blood should be quite fresh or be given at least within three hours of its collection. The antihemophilic globulin is rapidly eliminated, declining 50 per cent in eight hours; so that repeated transfusions must be given within this time if a safe level is to be maintained. Also, the quan-

tity of antihemophilic globulin varies in normal persons, so that if results are inadequate, different donors should be tried. Fresh plasma will preserve its antihemophilic globulin activity for weeks if kept frozen solid at −20 to −30 C. Fresh plasma dried lyophilically has a varied activity. It is probably best to prepare plasma by immediate centrifuging, and not by sedimentation. Even then considerable antihemophilic globulin is lost during the process, sometimes as much as one half, and most units of freshly frozen plasma have less than 50 per cent of mean antihemophilic globulin level after three months. In restoration of frozen plasma a rapid thawing in a water bath should be used at 37 C.; otherwise the plasma proteins will denature with formation of precipitate. Daily transfusions of 1 plasma unit will keep the circulating level of antihemophilic globulin above 5 per cent for only three hours out of 24, and 250 ml. of frozen plasma will extend this time to only 8½ hours.[12]

As a preparation for an operation or tooth extraction, the rapid transfusion of an amount of fresh plasma equal to about one fifth of the blood volume may be quite effective, if it is done shortly before the operation or extraction. The temporary elevation of the antihemophilic globulin level at the time of trauma is usually sufficient to cause a firm clot approaching normal or to cause coagulation within normal limits. This clot will last several days or at least long enough for healing to be complete.

In cases of initial bleeding, blood or plasma transfusions can seldom provide enough antihemophilic globulin to cause efficient clot formation. Their main value is in maintaining blood volume, and any hemostatic action actually is as an adjuvant to the patient's own resources. Furthermore, transfusions will eventually have very little beneficial effect if done repeatedly, as antibodies and anticoagulants may be formed.[13] I therefore never give transfusions of blood or plasma unless the patient's hemoglobin has fallen below 4 Gm. or other dangerous symptoms such as shock are apparent. One must bear in mind that the hemophiliac is always going to need care and that the particular bleeding episode is simply one of many that will occur. To use blood unnecessarily will simply eventually eliminate the one therapeutic tool that can, if used sensibly, keep the patient alive.

Concentrated preparations of antihemophilic globulin have been used with varying success, probably due to differences in methods of assay. Fraction 1 of Cohn, if reliquefied with distilled water, has a protein equivalent of 60 to 75 ml. of plasma, with a presumable antihemophilic globulin activity of 10 to 15 times that of the comparable volume of plasma from fresh blood. Intravenous administration is more reliable in reducing the coagulation time than intramuscular injection. One unit (equivalent to 0.2 Gm. of protein) will usually maintain the antihemophilic globulin level for more than three hours. However, these results are quite unpredictable, probably due to varying material. Animal antihemophilic globulin has been used, but here one must remember that this is foreign protein and anaphylactic reactions may result.

Other methods of treatment have been advocated, most with indifferent success. These are usually substances of the thromboplastic type. For the last 10 years I have been using histamine. This is based on the clinical and experimental evidence

that intravenous or subcutaneous injections of histamine increase directly the qualitative disintegration of the blood platelets.[14] This may also be caused by an antagonistic action between heparin and histamine. Heparin in high concentrations does not inhibit completely the increased tendency toward in vitro agglutination of the platelets exposed in vivo to histamine.

The following plan is followed: 0.1 mg. of histamine is given the first day, 0.2 mg. the second, 0.4 mg. the third, 0.8 mg. the fourth, and 1.0 mg. the fifth. If given intravenously, the histamine is given in 250 ml. of isotonic sodium chloride solution at a rate of 20 drops/minute. By hypodermoclysis, the same quantity is given at the rate of 10 drops/minute. In the majority of cases of antihemophilic globulin deficiency, this has decreased the coagulation time of the blood and caused a cessation of hemorrhage. Results are not obtained, however, until after the 0.8 mg. level is reached and it may also be necessary to continue the last injection (1.0 mg.) several times, but more than this quantity should never be given. In case of histamine reaction, as shown by flushing and headache, 300 mg. of vitamin C is given. This is used in all hemophiliac patients in whom we wish to spare the use of blood. As with other forms of treatment, there is a tendency for the patient to become refractory as the treatments are continued. The treatment fails utterly in some instances and results are very unpredictable in plasma thromboplastic complement deficiency. The treatment is useless in other forms of coagulation disturbance.

In all of the other diseases of the hemophilia-like syndrome the local treatment is quite like that for hemophilia. In regard to general treatment, it must be remembered that the antihemophilic globulin fraction is specific only for hemophilia and that, since this fraction is labile, fresh blood or plasma is necessary treatment of hemophilia and factor V deficiency. There is no problem of lability in the other diseases of the group, and these can usually be corrected with bank blood and stored plasma. Occasionally this is not successful, and coagulation can be accomplished only with fresh blood. At the present time we have a patient with plasma thromboplastic component deficiency who is refractory to all except fresh three-hour blood and another who is refractory to both bank and most fresh blood.

Last and most important in the treatment of these diseases, particularly the more severe ones such as hemophilia and plasma thromboplastic component deficiency, is the preparation of the patient and family to the realization that this is a lifelong condition. As soon as the diagnosis has been proved, the child should be trained in early life to adapt himself to it and to accept various limitations enforced by the illness. While it is quite true that in most cases the condition is observed in childhood, the disease is no worse in childhood than at a later period of life. It is only that physical hyperactivity and immaturity of perception make the child more susceptible to incidental and accidental trauma, with the possible initiation of hemorrhage.

The physician must explain the condition to the parents with the attendant limitation of activities that endanger the child with the possibility of resulting injuries. The finest tact is necessary to keep the child from becoming a psychological cripple. Not only should the physician and parents cooperate in this, but the medical social worker and school authorities can all help in outlining a satisfactory

plan of restricted activity. It is only by this means that there can be a normal childhood that will avoid the occurrence of hemorrhagic episodes.

Finally, one must not overlook proper help and progress with the physical therapist and orthopedist. Such necessary care that they may outline will often arrest what otherwise might be a permanent crippling disability. Sooner or later, hemorrhage into a joint will result, and it is here that these specialists can be of such material benefit.

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Ataraxics Help Cattle Rustlers

Members of the Montana Cattlemen's Association have complained that cattle rustlers are now doing it the easy way by using ataraxics. The method consists of shooting a drug-containing pellet into cows by means of a high-power air rifle or pistol just before carting the animals away. Cattlemen say the new method has made rustling a comparatively quiet and orderly operation. The Department of Justice and the Food and Drug Administration are investigating the matter.

Digestion and Absorption as Factors in Body Weight*

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INTRODUCTION

The degree of digestion and of absorption of ingested food is not always accepted as significant in determining body weight except in persons whose digestive functions or absorptive organs have undergone pathological changes.[1] This paper will report opposing evidence in which undigested but digestible food particles occur in larger numbers in feces of persons with a naturally lean body contour than in persons inclined toward obesity.

HISTORY

Obesity has been classified into alimentary (simple) and glandular types.[2] The uncomplicated alimentary type, considered in this study, results when chemical substance and caloric supply exceed tissue replacement and energy demands. The demand is known to be altered by physical activity,[3–5] emotions,[2, 6] eating habits,[3, 7–10] health status,[11–14] and endocrine activity.[2, 11, 14–17] The supply is altered by intake, digestion, absorption, and metabolism.[12, 16–18] When any of these factors and conditions are altered, the supply and demand equilibrium is altered also.

MATERIALS AND METHODS

Persons and Groups Studied. This planned experiment used two groups, each composed of 30 patients hospitalized at either Corona Naval Hospital, Corona, California, or March Air Force Hospital, Riverside, California. Persons in the first group complied with controlled caloric intake, prescribed menus, comparable activity, additional physical and laboratory work-up, and responsibility of providing stools on request for cytochemical examinations.

Patients were selected for distinctiveness of body build and were classified into types 1, 2, and 3 corresponding to Sheldon's ecto-, meso-, and endomorphs.[19] Diets were varied to determine the effect on the number of undigested but digestible food cells and starch granules excreted. The number of food particles in the donor's feces was related ultimately to the appropriate physique type characterized below.

Members in the second group were identified and classified only after a microscopic examination showed that their stools contained an unusually large or an unusually small number of undigested but digestible cells and starch granules.

Physique Characteristics.

TYPE 1. Ten persons herein classified had linearity of body shape, conspicuous

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bony protuberances, thin muscles, decreased amounts of subcutaneous tissue, and large body surface area.

TYPE 2. Ten persons who formed this group had "athletic" physique, inconspicuous bony protuberances covered with heavy, hard muscles and subcutaneous tissue, considerable connective tissue, intermediate body surface area, and more confident and adjusted appearance generally than did persons of either of the other two groups.

TYPE 3. These persons generally had a "stout" physique with "roundness" of contour, a protruding, obese abdomen, a large trunk, heavy neck and thighs, excess adipose tissue, and tapering extremities.

Uniformity and Conformity. Factors analyzed or controlled as affecting appetite and body weight were activity, age, emotion, degree of health, food habits, hydration, physique, and sex.

FIRST GROUP. Among these 30 patients the uniform activity present in hospitals was supplemented by subdued activity programs applied to all concerned as long as they were hospitalized or in quarters. After discharge to duty, activity was determined by demands of each person's job. Ages of patients studied ranged from 20 to 30 years and averaged 25; 18 (60 per cent) were between ages 23 and 27. Emotional stress and exigencies were minimal. No attempt was made to control or influence evident dispositional variations. Appetite appeasement with extra food was denied. No attempt was made psychologically to evaluate individual difference and responses. All 30 patients had basal metabolic rates within normal limits (± 10) on the first or repeated tests. Of seven repeated tests, five initially were low, two high. The degree of health was comparable, i.e., no one was acutely ill or febrile, had diarrhea, malnutrition, or psychoneuroses as a recorded diagnosis, or complained of digestive disturbance. Previous habits affecting appetite or satisfying it were largely controlled through the accepted diets. A perceptible increase in dehydration or hydration did not occur. Sexes were identified in analyzing the results. Willing cooperation, except in following the 800 calorie diet, retained considered and other variables at a minimum.

SECOND GROUP. Members of the second group were not controlled as this phase of the study was intended only to determine if a relationship existed between digestible but undigested food particles in feces and the considered body types.

Diets.

TYPES. Diets for the first group were: 2550 calories, "control"; 3500 calories, "high caloric"; 2550 calories, "high protein"; 2550 calories, "high lipid"; 2550 calories, "high carbohydrate"; 800 calories, "low caloric"; and 2550 calories, regular menu (mess hall or officers' club).

CALCULATIONS AND DURATION. Calories for each patient on each of the seven diets were determined on the basis of age, height, and weight by calculations and from tables. Means (e.g., age, 25 years; height, 70 inches; and weight, 177 lb.) served as the standard. After members of the group were selected, servings were calculated as deviations from this standard. Portions were individually weighed. Each diet was continued for an interval of three weeks. Since only 10 patients completed the low caloric diet, it was deleted from analysis.

All patients of the first group simultaneously began each of the seven diets. Possible error introduced by this uniform sequence of diets and group procedures was recognized but it was used nevertheless, as this error appeared much less real than error introduced by probable lack of cooperation and failure by dietitians and patients to observe diet restrictions if random sequence were permitted. Furthermore, administratively and technically the experiment was permitted only as herein indicated.

CONTENTS. The control diet containing 2550 calories consisted of 250 Gm. (300 calories/100 Gm. or 750 total calories) lean beef; 250 Gm. (100 calories/100 Gm. or 250 calories) carbohydrate-containing starch (Irish potatoes), and 1550 calories of hospital menu diet, together totaling 2550 calories for a person aged 25 years, 70 inches in height, and weighing 177 lb.

The diet of 3500 calories contained 1050 calories lean meat, 360 calories Irish potatoes, and 2090 calories from the hospital menu.

The 2550 calorie high-protein diet (30 to 40 per cent protein) contained 750 calories lean beef (as in the control) with the other protein calories selected from these foods (protein content given as per cent in parenthesis): fish (20 to 25 per cent), broiled lean meat (40 to 55), wheat germ (25), nonfat milk (33). The 2550 calorie high-lipid diet (40 to 50 per cent fat) consisted of butter (81 per cent fat), brazil nuts (65.9), cashews (48), cheddar cheese (32), coconut (35), cream (30 to 35), egg yolks (32), and fat meat (50 to 70). The 2550 calorie high-carbohydrate diet (65 to 75 per cent carbohydrate) consisted of 250 calories Irish potatoes and the remaining calories of carbohydrates from bread (55 to 80 per cent), cake (55 to 60), candied sweet potatoes (25), hard candy (99), corn flakes (85), navy beans (50 to 60), oatmeal (70), pancakes (70 to 75), pies with starch filling (65 to 75), rice (25), sugar (99.5), and sirup (75 to 80).

Control of diet among subjects in the second group was neither planned nor, as it turned out, permissible as stools selected came largely from acutely ill or infant patients.

Cytochemical Tests. Food residue detected by cytochemical tests and averaged per 100 fields using 5X oculars and 16 mm. objective were voluntary muscle fibers, other cells containing lipids, and starch granules. Host cells, e.g., blood and epithelial cells, were not counted.

Feces from each patient in group 1 were smeared for cytochemical examination four to seven days after admission. Submitted stools were examined randomly; at no time were they grouped by body type of donor. Smears, fixed and fluid, for lipids were thoroughly mixed in a standard-sized saline droplet, spread equally thin in a film, and stained blue-black with Sudan black B.[20] Starch granules in smears similarly prepared stained blue with Lugol's iodine.[20] Arginine in proteins of striated muscle fibers stained orange-red by the Sakaguchi reaction, tyrosine stained rose-red by the Millon reaction, and amino and sulfhydryl groups stained purplish red by the dinitrofluorobenzene method.[20]

Equally thin saline, Lugol's, and Sudan black B films, a Sudan black B slide, and slides for amino acids were prepared two days before the end of the third week of each dietary course. Averages from 100 fields magnified as previously mentioned

TABLE I

Analysis of Variance of Lipid, Muscle, and Starch in Group 1

Source of variation*	Degree of freedom	Mean squares		
		Lipid	Muscle	Starch
M	2	2,242.07 †	2,215.24 †	1,670.86 †
$P(M_1)$	9	104.59 †	117.71 †	75.44 ‡
$P(M_2)$	9	14.92 †	12.15 †	8.96 †
$P(M_3)$	9	3.00 †	1.61 †	3.35 §
$D(M_1)$	5	572.88 †	599.27 †	384.41 †
$D(M_2)$	5	15.55 †	17.59 †	25.53 †
$D(M_3)$	5	3.00	7.71	10.17
$D \times P(M_1)$	45	16.88	16.80	31.18
$D \times P(M_2)$	45	0.55	0.56	0.70
$D \times P(M_3)$	45	0.26	0.27	0.91

* M = Body types: M_1 = ectomorph; M_2 = mesomorph; M_3 = endomorph. $P(M_i)$ = Patients within body types. $D(M_i)$ = Diets within body types. $D \times P(M_i)$ = Diet × patient interaction within body types.

† Statistically significant at the 0.001 level of probability.

‡ Statistically significant at the 0.05 level of probability.

§ Statistically significant at the 0.01 level of probability.

were tabulated for cells containing lipids, for meat fibers, and for starch granules. Magnifications higher than 5X x 16 mm. improved identification of fragments where necessary.

Statistical Analyses. Observations were evaluated by analysis of variance (split plot design) using patients as main plots and diets as subplots. Tables by Duncan[21] served to evaluate the diet mean differences. The confidence levels are given as 95 and 99 per cent to conform with general parlance, although they are somewhat lower. Body type mean differences were evaluated by the method of Cochran and Cox.[22]

RESULTS

The results of analysis of variance of the lipid, muscle, and starch data are given in table I, along with the explanation of the code symbols used below.

Lipids. The three error variances (D x P [M]) were not statistically homogeneous ($\chi^2_2 = 197.98$), so that it was inadvisable to pool them into a common error variance

TABLE II

Means of Lipid, Muscle, and Starch of M_1, M_2, and M_3 in Group 1

Lipid		Muscle		Starch	
Body type	Means	Body type	Means	Body type	Means
M_1	$_{c}12.29_{b}$*	M_1	$_{c}12.31_{c}$	M_1	$_{c}11.11_{c}$
M_2	$_{b}2.63_{a}$	M_2	$_{b}2.71_{b}$	M_2	$_{b}3.09_{b}$
M_3	$_{a}0.98_{a}$	M_3	$_{a}1.06_{a}$	M_3	$_{a}1.16_{a}$

* Subscripts on the left indicate statistical populations at the 95 per cent confidence level; on the right, at the 99 per cent confidence level. Two means are statistically different if they do not have a common subscript at the stated confidence level.

for testing the mean squares of diets and diet times body type interaction. Instead, each diet mean square (D [M]) was tested against its own error. All were significant at the 0.001 level of probability.

Although the P(M) mean squares were not heterogeneous ($\chi^2_2 = 3.37$), it was deemed advisable to keep them separate. The M mean square was significant at the 0.001 level when tested against the largest P(M) error mean square.

Muscle. The three error variances (D x P [M]) were heterogeneous ($\chi^2_2 = 195.25$). The testing pattern just described for lipids was repeated for this variable. All three diet mean squares (D [M]) were significant at the 0.001 level.

The three P(M) mean squares were heterogeneous ($\chi^2_2 = 11.10$). The M mean square was significant at the 0.001 level when tested against the largest error mean square (P [M_1]).

Starch. Here too the three error variances were not homogeneous ($\chi^2_2 = 186.50$), and the testing plan for D(M) remained as previously described. The three D(M) mean squares were significant at the 0.001 level.

The three P(M) mean squares were heterogeneous ($\chi^2_2 = 20.59$). The M mean square was significant at the 0.001 level when tested against the largest error mean square (P [M]).

TABLE III

Lipid Means for Diets for Each Body Type in Group 1

Body type M_1		Body type M_2		Body type M_3	
Diet*	Means	Diet	Means	Diet	Means
4	$_{d}26.61_{d}$†	2	$_{c}4.44_{b}$	4	$_{d}1.82_{c}$
2	$_{c}13.75_{c}$	4	$_{c}3.93_{b}$	2	$_{c}1.35_{bc}$
3	$_{bc}11.36_{bc}$	5	$_{b}2.22_{a}$	7	$_{b}0.86_{b}$
1	$_{ab}8.35_{ab}$	3	$_{ab}2.07_{a}$	1	$_{b}0.83_{ab}$
7	$_{ab}8.23_{ab}$	1	$_{ab}1.74_{a}$	3	$_{b}0.81_{ab}$
5	$_{a}5.48_{a}$	7	$_{a}1.39_{a}$	5	$_{a}0.21_{a}$

* Diet code: control—1, high caloric—2, high fat—3, high protein—4, high carbohydrate—5, regular—7.
† See footnote to table II for explanation of subscripts.

TABLE IV

Muscle Fiber Means for Diets for Each Body Type in Group 1

Body type M_1		Body type M_2		Body type M_3	
Diet*	Means	Diet	Means	Diet	Means
4	$_{d}26.78_{d}$†	2	$_{c}4.58_{b}$	4	$_{d}2.53_{d}$
2	$_{c}14.35_{c}$	4	$_{c}4.15_{b}$	2	$_{c}1.54_{c}$
3	$_{bc}11.56_{bc}$	5	$_{b}2.50_{a}$	7	$_{b}1.01_{bc}$
1	$_{ab}8.04_{ab}$	1	$_{a}1.71_{a}$	1	$_{b}0.89_{b}$
7	$_{a}7.52_{ab}$	7	$_{a}1.67_{a}$	3	$_{a}0.28_{a}$
5	$_{a}5.65_{a}$	3	$_{a}1.66_{a}$	5	$_{a}0.15_{a}$

* See footnote to table III for code.

† See footnote to table II for explanation of subscripts.

The lipid, muscle,and starch means for the three body types are given in table II.

At the 95 per cent confidence level the means of M_1, M_2, and M_3 are statistically different from each other for lipids, for muscle, and for starch.

At the 99 per cent confidence level the significances remain different for muscle and for starch. For lipid, however, the mean of M_2 is not significantly different from that of M_3; both means are significantly different from that of M_1.

Means of lipid, muscle, and starch for each body type and their statistical populations are given in tables III, IV, and V.

The analysis of variance for the three variables in group 2 is given in table VI. Here there was no statistical evidence of heterogeneity of error variances (χ_2^2 [lipid] = 1.03; χ_2^2 [muscle] = 3.64; χ_2^2 [starch] = 0.74), and they were pooled for a common error variance based on 24 degrees of freedom. The M mean square was significant at the 0.001 level of probability in lipid and in muscle and at the 0.05 level in starch.

The means of body types for the three variables and the statistical populations are given in table VII.

TABLE V

Starch Granule Means for Diets for Each Body Type in Group 1

Body type M_1		Body type M_2		Body type M_3	
Diet*	Means	Diet	Means	Diet	Means
5	$_{c}21.25_{c}$†	2	$_{d}5.48_{e}$	5	$_{e}2.85_{e}$
2	$_{b}15.68_{bc}$	5	$_{c}4.65_{e}$	2	$_{b}1.89_{bc}$
7	$_{a}9.53_{ab}$	3	$_{b}2.76_{b}$	1	$_{a}0.76_{ab}$
1	$_{a}9.12_{ab}$	7	$_{ab}2.29_{ab}$	7	$_{a}0.71_{ab}$
3	$_{a}5.88_{a}$	4	$_{a}1.76_{ab}$	4	$_{a}0.60_{a}$
4	$_{a}5.22_{a}$	1	$_{a}1.64_{a}$	3	$_{a}0.15_{a}$

* See footnote to table III for code.

† See footnote to table II for explanation of subscripts.

TABLE VI

Analysis of Variance of Lipid, Muscle, and Starch in Group 2

Source of variation	Degree of freedom	Mean squares		
		Lipid	Muscle	Starch
		*	*	†
M	2	144.14	142.96	74.94
Error	24	6.18	7.14	16.33

* Statistically significant at the 0.001 level of probability.

† Statistically significant at the 0.05 level of probability.

DISCUSSION

Comparisons. Every laboratory worker probably has observed that repeated stools from a patient show characteristic digestible but undigested residual food particles. Notwithstanding, no study similar to this one is available for comparison. In 1935 Strang et al[13] studied chemically the stools of 9 patients for nitrogen and fat content and attempted to relate it to food intake and to body type. They concluded that gastrointestinal tracts of thin persons are in no way inferior to those of more robust persons, that there is no unusual loss of energy in thin persons, and that the digestion and absorption capacity of a thin person are adequate for any food intake. Their conclusions were based on studies of 9 "severely undernourished" patients in whom averages were: food intake, 1926 Gm.; feces, 165 Gm. (80 per cent water, 0.8 per cent nitrogen); average fat content in 3 cases, 1.9 per cent (75 per cent of total dry weight of stool and 16 per cent of ingested fat). Total fecal solids corresponded to 5.8 per cent of food solids. Patients absorbed 92 per cent of provided food or 95 per cent of total solids. Data suggested that food nitrogen as well as total mass uptake influenced the amount of nitrogen in the stools.

Inadequately considered in this study on 9 severely undernourished patients were the following factors: The large bacterial content, which composes about ⅓ the dry weight of feces, includes considerable protein and fat that would not be differ-

TABLE VII

Lipid, Muscle, and Starch Means for Each Body Type in Group 2

Body type*	Means		
	Lipid	Muscle	Starch
M_1	$_{c}9.78_{c}$†	$_{c}9.67_{b}$	$_{b}7.67_{a}$
M_2	$_{b}6.00_{b}$	$_{b}6.33_{b}$	$_{b}6.67_{a}$
M_3	$_{a}1.78_{a}$	$_{a}1.82_{a}$	$_{a}2.24_{a}$

* See footnote to table I for body type code.

† See footnote to table II for explanation of subscripts.

entiated from ingested food residue. Some of these bacteria are living and would continue to multiply, catabolize food, and anabolize needed proteins and stored fats. No histochemical studies were made to identify and compare kinds and amounts of undigested but digestible food particles as recognizable units of ingested food.

Group and Type Variances. In group 1 (tables III and IV), the high-protein and high-caloric diet means rank first and second in lipid and in muscle. These means apparently represent different populations in body type 1 (ectomorphs) and type 3 (endomorphs). In type 2, however, these two diet means are not statistically different from each other. The high-carbohydrate diet mean is low in lipid and in muscle in type 1 and type 3, although not always statistically different from the next higher ranking mean. In type 2, however, this mean is significantly higher than the lowest ranking mean in both lipid and muscle. In contrast, the high-carbohydrate diet mean ranks first in starch (table V) in both body type 1 and type 3 and conclusively is distinct from the high-caloric diet, which has the second highest ranking mean. In type 2, contrarily, the high-caloric diet mean ranks first, probably making it a distinct population from the high-caloric diet mean, its nearest figure. The high-protein diet mean of starch ranks low in all three body types.

In group 2 (table VII), body types 1, 2, and 3 are separate populations both for lipid and for muscle at the 95 per cent confidence level. Statistical evidence is inadequate to separate body type 1 from type 2 for starch. Apparently, however, both are populations distinct from body type 3.

Possible Reasons for Differences. Why there are significant differences in the number of digestible but undigested food particles of varying sizes in feces of body types 1, 2, and 3, in that order of frequency, remains undetermined. Possible reasons include the following: group differences in gross anatomy and physiology of the gastrointestinal tract; differences in size and efficiency of absorption, digestion, and secretion surfaces; differences in amount of energy and materials that arrive at cell sites—complete digestion, absorption, and metabolism of ingested food means high economy of food utilization with resulting increased energy, and food supplies that exceed energy demands increase fat storage; speed at which food leaves the gastrointestinal tract; possible quantitative differences in digestive enzymes and their availability to substrates; ingested food that is not digested, absorbed, and metabolized—such food contributes nothing to nutrition and, therefore, is equivalent to a lower caloric diet.

These and other factors may contribute to the thinness and larger undigested food residue of type 1, to the obesity and small residue of type 3, and to the intermediate position of type 2.

SUMMARY

1. Patients classified into body types 1, 2, and 3 showed in that order a decrease in the number of undigested but digestible amino acids in meat fibers, lipids in food cells, and starch granules in their feces throughout a sequence of seven calculated diets. These differences were generally significant statistically.

2. Significant differences also occurred in the rankings of the diet means in the three body types for lipids, striated muscle, and starch.

3. Demonstrated diminished economy in digestion and absorption of ingested food is submitted as another factor affecting degree of nutrition.

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The Seventh Annual Symposium on Antibiotics

World medical authorities from more than 20 nations were among over 1000 persons who attended the Seventh Annual Symposium on Antibiotics, held November 4 to 6 in Washington, D. C., under the chairmanship of Dr. Henry Welch and sponsored by the journals *Antibiotics & Chemotherapy* and *Antibiotic Medicine & Clinical Therapy*, published by MD Publications, Inc.

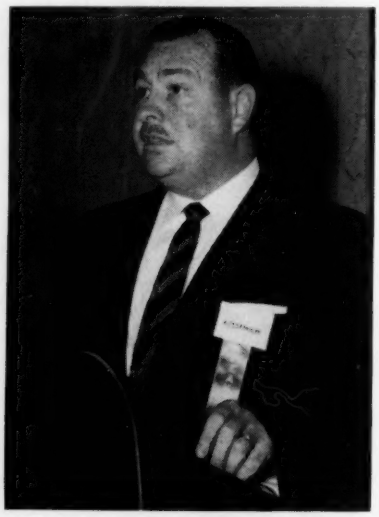
At the opening session of the Symposium five speakers discussed "The Challenge of New Drugs to Our Society." Félix Martí-Ibáñez, M.D., Professor of the History of Medicine, New York Medical College, Flower and Fifth Avenue Hospitals, and Editor-in-Chief of the medical newsmagazine *MD*, spoke on "The Great Historical Challenges in Medicine," stating that the seven great medical challenges of the past were when, in Egypt and Mesopotamia, medicine men tried to master the menaces of the environment with the use of magic; Greek philosophers used the instrument of thought to unravel the mysteries of the universe and to awaken man's conscience and dignity; the fight in the Middle Ages against pandemics; the Renaissance's exploration of the human body, which paralleled that of the seas by navigators; the Baroque period, when dynamic physiology replaced static anatomy; the nineteenth-century scientific attempt to break with the old empirical approach to therapy; and the understanding of the nature and biochemical substrata of disease today.

Opening session of the Seventh Annual Symposium on Antibiotics, held November 4 to 6 in Washington, D. C.

Dr. Henry Welch (right), chairman of the Symposium, delivering the opening address. Dr. Félix Martí-Ibáñez (below), who spoke on "The Great Historical Challenges in Medicine."

Dr. Austin Smith (left), who spoke on "The Challenge of New Drugs to the Pharmaceutical Industry." Dr. Maxwell Finland (right), who spoke on "The Challenge of New Drugs to the Clinical Investigator."

He added that there was now a danger of creating a "mythology of science" that, like Greek mythology, would overestimate the power of the "hero" (the investigator) and his weapons (technology). He warned against the abuse of experimentation without the guide of a philosophical concept, as hypertrophy of such experimentation might lead to atrophy of imagination of the investigator.



Dr. John J. Curry (left), who addressed the opening session on "The Challenge of New Drugs to the Practicing Physician." Dr. William H. Kessenich (right), who spoke on "The Challenge of New Drugs to the Food and Drug Administration."

The true guarantee of the future of medicine, he added, lies in the virtues—goodness, greatness, genius, spirit of inquiry, lucidity, patriotism, and universality—of the men who today are meeting the great challenges still facing them.

Also at the opening session, Dr. Austin Smith, president of the Pharmaceutical Manufacturers Association, said that the challenge of new drugs to the industry included the need to explore areas of disease not under control, to develop refined techniques of therapy, research, and education. Dr. Maxwell Finland, Associate Professor of Medicine, Harvard Medical School, said that the clinical investigator has several roles to play: to initiate ideas that might lead to the discovery of new agents or new use of old drugs; second, to aid the laboratory scientists in initiating new agents in needed areas; third, to explore the possibilities of entirely new agents and principles developed by the laboratory scientists; fourth, to help improve drugs already proved to be effective.

The pharmaceutical industry's research programs, coupled with those of the government, promise many and more potent drugs in the future, said Dr. William H. Kessenich, medical director of the Food and Drug Adminstration. He added that the FDA was challenged to provide high caliber reviews of these drugs, the basic motive being the welfare of the public and not the common lure of the market place. Dr. John J. Curry, Associate Clinical Professor of Medicine, Georgetown University, Washington, D. C., said that respect for the medical profession has deteriorated as the reliance on new drugs has increased. This is in great part due to loss of fear of acute illness, as well as socioeconomic changes and the increasing materialistic philosophy of the United States, he added.

Opening the Symposium, Chairman Dr. Henry Welch said—in regard to the announcement at the Symposium of a synthetic penicillin by Bristol Laboratories, the first of its kind—that innumerable synthetic penicillins were possible, Bristol having prepared more than 500 already. Dr. Welch said, "Perhaps here we have a key that the near future may open the door to a broad-spectrum penicillin, to antifungal or antiviral penicillins, or even to penicillins active against tumor cells by the correct manipulation of the guiding side chain."

Of the 160 papers presented at the Symposium, a large number concerned the new broad-spectrum antibiotic, demethylchlortetracycline. The new drug is reported to stay in the blood much longer than tetracycline and 48 to 72 hours longer than either chlortetracycline or oxytetracycline. It is presumed that this is because the compound is excreted only 43 per cent as fast as tetracycline. Clinical implications are that less of demethylchlortetracycline will probably be required to obtain an antibacterial effect equal to that of the older antibiotics.

Thirteen clinicians reported that demethylchlortetracycline was found to be effective against a variety of infections, including some caused by such organisms as *Aerobacter aerogenes*, *Proteus*, and *Pseudomonas aeruginosa*. The drug gave good results in stubborn urinary tract infections, pneumonia, gonorrhea, lymphogranuloma venereum, brucellosis, primary atypical pneumonia, bacillary dysentery.

A Harvard team headed by Dr. Maxwell Finland reported on a controlled study on 160 patients with a variety of infections. Half received demethylchlortetracycline, in a dosage of 500 to 600 mg./day; the remainder received 1000 mg. of

tetracycline. The gastrointestinal disturbances were twice as frequent among patients receiving tetracycline as among those taking demethylchlortetracycline; the clinical results obtained with the two drugs were indistinguishable.

Another new antibiotic reported on was colistin, originally isolated by Japanese research workers and now being developed in the United States by Warner-Chilcott under the trade name of Colymycin. This drug is most effective against gram-negative organisms, and resistance can only occasionally be induced.

Reports on paromomycin showed it to be an effective agent against amebiasis and other intestinal tract infections. Trials in more than 1000 patients in 12 different countries showed the drug to be active against acute and chronic bacterial infections of the intestinal tract, without causing side effects.

The new antibiotic rifomycin was reported to have low activity but also low toxicity. Other new antibiotics reported on at the Symposium were aspartocin, fervenulin, and streptozotocin. Also reported were good results in the treatment of deep systemic fungal infections with amphotericin. A number of papers were presented on the success of griseofulvin in a variety of fungal infections. Two new antitumor agents presented this year were streptonigrin and diazomycin, although no clinical studies were scheduled at the Symposium.

Two panel discussions were held at the Symposium: "The Present Status and Problems Involved in Human Sensitization to Antibiotics," moderated by Leo H. Criep, and "Chemotherapy of Acute and Chronic Pediatric and Geriatric Infections," moderated by Sydney Ross (pediatrics) and Douglas H. Sprunt (geriatrics).

The proceedings of this Seventh Annual Symposium on Antibiotics will appear in the book *Antibiotics Annual 1959–1960*, to be published in February, 1960, by Antibiotica, Inc.

Course in Principles and Practice of Geriatric Rehabilitation

A two-week course in principles and practice of geriatric rehabilitation, to be held April 25–May 6, was recently announced by the Department of Physical Medicine and Rehabilitation, New York Medical College-Metropolitan Hospital Center. The course will be held at Bird S. Coler Hospital, New York City. Intended for registered nurses, occupational therapists, physical therapists, and social workers, the course is planned to provide intensified training in the rehabilitation care of the elderly chronically ill patient and will offer a comprehensive and practical presentation of such care in hospital, home, old age home, and nursing home. It will consist of lectures, seminars, clinical demonstrations, and practice workshops. The teaching staff includes members of the faculty and professional staff of the Medical Center.

Applications will be accepted from registered nurses, physical therapists, occupational therapists, and graduate social workers. Applications must be submitted by March 1. Enrollment will be limited. A tuition fee of $100.00 will be charged for the course. Those interested should contact Dr. Jerome S. Tobis, Chairman, Department of Physical Medicine and Rehabilitation, New York Medical College, 1 East 105th Street, New York City 29.

Tell Me a Story*

Félix Martí-Ibáñez, M.D.

PROFESSOR AND CHAIRMAN OF THE DEPARTMENT OF THE HISTORY OF MEDICINE,
NEW YORK MEDICAL COLLEGE, FLOWER AND FIFTH AVENUE HOSPITALS;
EDITOR-IN-CHIEF OF MD MEDICAL NEWSMAGAZINE
NEW YORK, N. Y.

Tell me a story. . . . Around the Christmas fireside, in the glow of crackling logs, children are pleading to be told a story. The father, perhaps a physician, may regale the children with morsels of life culled from his daily toil. But the child craves fairy tales. And when he does not get them, he then uses the magic wand of his fantasy to transmute the world around him into a glittering fairyland in which his own home becomes a luminous crystal-walled palace.

I believe in telling children fairy tales. A time ago the child was considered "a little man" who had to be fed a steady diet of facts. Today we know that a child is only a child, and even when he becomes a man there still dwells in him a child, who now and then tinkles inside him as the little pebble tinkles inside a jingle bell.

All the expressions of a child are variations on the theme of his search for his own individuality, for an answer to his questions, "Who am I?" and "How can I distinguish myself from my world?" His thoughts resemble the magic thought of primitive people in the sense that he invents his own causality relations and accepts his fantasies as reality. He differentiates himself from his world not through his thinking but through his feelings and his games. Playing for him is a rehearsal of his role in real life. To the adult, play is recreation; to the child, it is hard work and serious business.

The child should be fed not only technical instruction at school but also a fantasy feast at home. The impulses that dominate childhood are biologically even more important than his culture. In the child, to *wish*, which is to dream, is more important than to *want*, which involves action. Actually, the first nourishes the second. But the child confuses them both. To him, the things he desires, however unreal, are more important than real things. If the adult mind makes history, that is, reality, the child's mind makes legends, or the desirable. Myths and legends therefore are the best psychic hormones for the child.

Fairy tales appeal to the child because their fabric is similar to that of his thought. Primitive myths and legends help us to understand the infancy of mankind, just as fairy tales show us the infancy of man.

Myths once governed the creation of European culture. Later, the gods were exiled to earth, wherefrom they still rule our daily life through the image of their mythological deeds. Only artists have remained as custodians of the gods. The rest of us, in our hurried life, do not dream enough, and daydreams are important,

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* These editorials originally appeared in *MD* Medical Newsmagazine. "Tell Me a Story" was published in December, 1959, *MD*; "Through a Stained Glass Window," in an abridged version, in January, 1960, *MD*.

for they are both the truest form of dreams and the modern counterpart of myths.

Like primitive man, the child identifies himself with the outer reality in the belief that to manifest his wishes is sufficient to make them come true. In his own world, as in fairy tales, the child allots magic powers to objects surrounding him. To the child the world is a jungle bristling with dangers, as the primeval forest was to primitive man. From his awareness of his disproportion and weakness in face of the gigantic outer world were born such classic tales as *Gulliver's Travels* and *Through the Looking Glass*.

Wolves, goblins, evil genii are fairy tale symbols of the forces in the adult world that threaten to devour the child's ego. In a tale for a child lost in the fearsome darkness of the forest—which matches that of his own bedroom—the only refuge against such forces is the magic square of gold cast upon the dark forest by the illuminated window of fairy tales. In real life, though, the child may stop dreading the nocturnal darkness once he realizes—as in the story by Madeleine Gekire—that he can with his own imagination "switch on the night," "turn on" the moon and the stars, the crickets and the frogs, and all the other wonderful lights and sounds that are part of the night.

Let us, then, keep telling children tales of wonder. And let us never forget that the most wonderful tale of all was that of a Child born on that first Christmas when Mary "brought forth her firstborn son, and wrapped him in swaddling clothes, and laid him in a manger; because there was no room for them in the inn." This tale is particularly beautiful to us as it was told almost 2000 years ago, in stained-glass words in the Gospels, by a good and kind Greek colleague, St. Luke, the beloved physician.—*Félix Martí-Ibáñez, M.D.*

The Epic of Medicine (V)

THROUGH A STAINED GLASS WINDOW*

(Byzantine Medicine, 476-1453)

On entering a Gothic cathedral today one feels as if weird fauna were rushing down from windows and capitals. Griffins, gargoyles, and dragons, long imprisoned in the Gothic cage, that "trap of fantasy," seem ready to set off in chase of that elusive quarry of the Infinite. Man must have felt much the same at the beginning of the so-called Middle or Dark Ages, when upon him descended the avalanche of beauty and squalor, romanticism and roguishness, chivalry and sadism that characterized the age of the Crusades, the Gothic cathedrals, the *Divine Comedy*, and the *chansons de geste*.

We should not call "Dark Ages" a period that gave birth not only to such men

* This editorial is the fifth of a series of twelve devoted to presenting a philosophical outline of the history of Medicine.

as St. Thomas Aquinas, Albertus Magnus, and Arnaud de Villeneuve, but also to the three great bases of modern medicine: universities, hospitals, and public health. True, in the first four centuries of this period, man wallowed in magic, and the invisible threads binding him to stars and amulets ruled his life; but for the remainder of the Middle Ages he valiantly combated the ignorance and bigotry surrounding him. Rather than the "Middle Age," that is to say the maturity, of Europe, this was her childhood, when she began to awaken to a new view of man and of things.

In the fifth century the pendulum of history had swung from Rome to Byzantium, the city with a thousand gilded domes bathed by the waters of the Golden Horn and the Bosporus. Thereafter, for the next thousand years, until the fall of Constantinople to the Turks, or, if a medical date is preferred, until the publication of Vesalius' *Fabrica*, Greco-Latin medical learning would flow through three channels—Byzantium, the Arabian empire, and the monastic universities—which would later converge into the resplendent broad stream of the Renaissance.

Byzantium, later called Constantinople, and now called Istanbul, kingdom of God on earth, was for ten centuries the unattainable dream of the barbarians, who coveted its rich treasures. A walled bastion in a hostile world, defended by the walls built by Theodosius and the azure waters of the Bosporus, Byzantium defied the pagan hordes for a thousand years after Rome herself had succumbed. Century after century, Mongols, Turks, and Tartars, attracted by the glittering domes and the legend of its treasures, vainly attacked the invincible city.

Life in Byzantium was cloistered. The people, deprived by the city walls from looking ahead, looked up and back: at heaven and at the past. Their emperor, the basileus, was regarded as Christ on earth; his political code was the Bible; his parliament, the holy apostles; his offices were the basilicas, vast and towering and ablaze with gilded mosaics in all the colors of the rainbow. He appeared in public "pale as death," robed in white and surrounded by his twelve apostles. His meals were replicas of the Last Supper; his garments and countenance, of those in sacred icons. His palace was yet another church where even the porter was a priest. The finest silks and porcelain, gilded mirrors, carved ivory chess sets, damask tapestries, jeweled enamels, coats of mail, diamonds and other gems, gold chalices, sandalwood and ebony caskets, jewelry and table services inlaid with precious stones, carpets and ceramics jammed the treasury of the city, which like a golden cloud gleamed above the Bosporus and the Golden Horn. Founded by Romans, Constantinople was inhabited by Greeks, Romans, and Asiatics. Its basilicas were the house of God; its palaces, the house of the church militant.

The lack of statuary was compensated by the abundance of paintings—the "books" of the illiterate ancients—in which the Byzantines depicted what they *felt*, just as the Egyptians depicted in their art what they *knew*, and the Greeks what they *saw*. In Constantinople the dung-piled streets contrasted with the splendor of the palaces; the strange Christian democracy, with the stern ruling theocracy.

Under Byzantium's three great emperors—Constantine I, Julian the Apostate, and Theodosius—Byzantine culture developed in flight from the present to the past, its art turning from the classical portrayal of the human being to the introvert

world of mosaics, bas-reliefs, and miniatures, and its medicine taking refuge in endless compilations of Greek learning.

The Crusades introduced Europeans to the cultured world of Byzantium, a world protected by its geographical position on the confines of two worlds, at the end of a landlocked sea, by the principle of unity known as "Hellenism"—a community of language, ideas, and culture—and by the intricate web of Byzantine diplomacy, past master at weaving political intrigues.

In Byzantium—whose art was the art of Eastern Christendom, just as Roman art was the art of Western Christendom—the basilica was the house of God, an arrogant granite mass symbolizing the Church on a war footing and its everlasting might capable of resisting all sieges. The basilicas contained no statuary, for that was a symbol of paganism; in fact, they contained nothing that did not reek of religious asceticism. Religious imagery was prominent in mosaics, which were placed on walls and ceilings and not in the pavements as in Rome; for man, in his greater meekness, now looked toward heaven rather than to earth. The Oriental aversion to depicting the human form turned Byzantine art toward abstract and geometric motifs. The mosaics and multicolored paintings in the basilicas were an inspiration to visionaries, and its gems, to which were attributed magic properties, bore an obvious analogy to the mystical descriptions of heaven.

Typical of this art were the painted glass windows, ivory and metal filigrees, and illuminated initials sparkling with golden luster and precious stones. Stained glass windows were intended to inspire emotional ecstasy. Later, when the printing press was invented and, with the advent of the Reformation, the Bible was read inside the churches, church windows were made of transparent glass. Fraught with perfectionism and preciosity, Byzantine art was symbolic of the besieged capital, where man's only escape from his walled-in existence was to roam the limitless regions of time.

Renouncing travel in space, since fierce enemies were ravening on the other side of the walls, the Byzantines journeyed into time: the artists devoting themselves to time-consuming stained glass, and filigree work; and the physicians turning to the past in search of knowledge, since learning makes man lose his sense of isolation. As a result, Byzantine medicine turned backward, and was based not on investigation but on compilation. To Oribasius of Pergamon, Aetius of Amida, Paulus of Egina, Alexander of Tralles—to these men we owe the monumental tomes in which is preserved the medical lore of ancient Greece.

There being no one in Byzantium to garner the heritage of Galen and again raise the torch of experimental medicine, medicine became a matter of faith. The sick person was regarded as a potential saint; prayer was adopted as the best medicine, the priest as the best physician, the Church as the best hospital, and Christ as the Supreme Healer.

In the Byzantine empire, medicine was in the hands of priests and magi. The guardian saints, Cosmas and Damian, shed their light over the city. Nevertheless, the Roman appetite for luxury and sensual pleasures endured. Paradoxically, philosophical mysticism and the Oriental influence of demonology, magic, and alchemy existed side by side with the influences of Christianity. A medicine of priests,

Byzantine medicine bowed to ecclesiastical authority. Taking their example from Christ, their first physician, the fathers of the Church practiced medicine. They also erected hospitals, one of which with its annexes could accommodate 7000 patients. The sick were fed on fruit and wine, temple sleep was practiced, and physical and spiritual healing was promised to the faithful. Smallpox plagues, which scourged Constantinople often, were described by the priest-physicians.

The ancient pagan cults survived solely among the healthy. Christianity, with its appeal to the unclean, the diseased, and the sinners, became a powerful revolutionary force. The diseased person became a privileged being, and medicine was founded on faith and miracles, the Divine Word, and prayer. Faithful Christians renounced classical hygiene. The patients of the priests were mostly laborers and the needy, not the well-to-do classes, and the diseased body was extolled as the only possible dwelling for a healthy soul.

After surviving the ventures of the Crusaders, Constantinople finally fell in 1453, after a siege lasting several months, when the Ottoman Sultan Mohammed II, commanding half a million men, with the aid of greased logrollers hauled 72 galleys from the heights of Pera in twenty-four hours and in a single night placed them on the waters of the Golden Horn opposite the city, using his artillery to support his attack on the coveted prize.

One tragic day, through the *Kerkoporta*, at the shout of the war-cry *Yagma!* (Plunder!), the enemy poured into the thousand-domed city. Constantinople fell before the fury of the invaders who, scimitars in hand, spared neither Byzantine man nor Byzantine art, but set the seal of Ottoman art and religion on them both. In Istanbul today one can still see traces of that fatal hour: the shattered walls of Theodosius, which for one thousand years guarded the colossal basilicas, that miracle of architecture, symbol of an unprecedentedly beautiful and mighty civilization. Concurrently, Byzantine medicine yielded to the Ottoman medicine of the invaders.

With the fall of Constantinople, Hellenic learning migrated to the West, driven by the force of *humanitas*, that is to say, culture and the heritage of "man as a measure" of Nature.

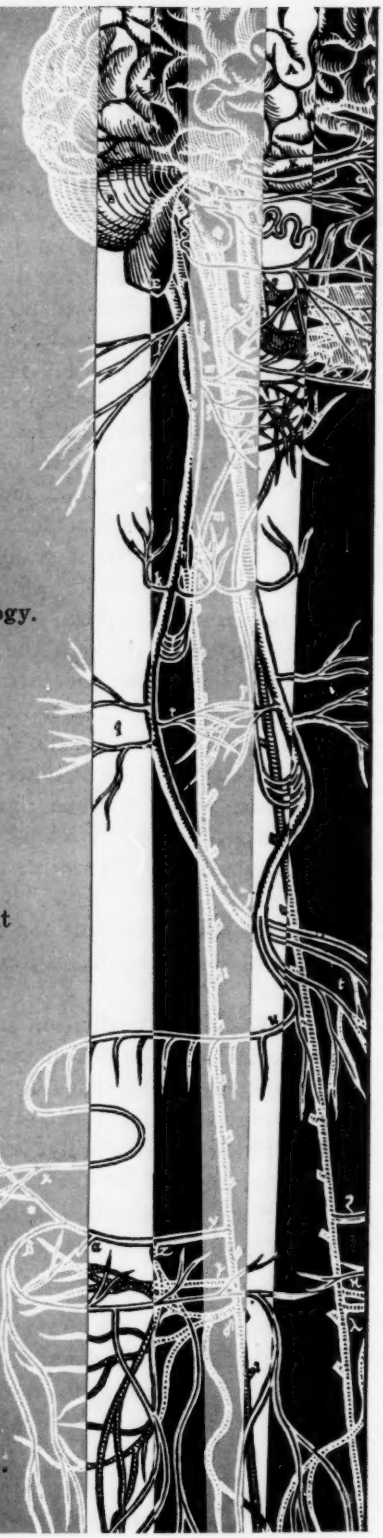
The Byzantine contribution to medicine was the creation of hospitals and the monumental compilations of medical knowledge by men who seem to have given no thought to the approaching storm, who, ignoring that they stood on the brink of an everlasting night, toiled as if they were bathed in the light of dawn. Byzantium stands in history like a bridge across the ocean of Time, thanks to which the Renaissance was enriched by the Greek classical learning imprisoned in the Byzantine compilations, whose pages were as subtle and eternal as the moon's reflection on the waters of the Bosporus.—*Félix Martí-Ibáñez, M.D.*

the first of its kind...

A HISTORY *OF* NEUROLOGY

by Walther Riese, M.D.

Associate Professor of Psychiatry and Neurology; Chairman, Department of the History of Medicine, Medical College of Virginia, Richmond, Virginia
Consulting Neuropathologist to the Department of Mental Hygiene and Hospitals of the Commonwealth of Virginia



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Proceedings of the Sixth Annual Symposium on Antibiotics, Washington, D. C.
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A HISTORY *of* OPHTHALMOLOGY

by George E. Arrington, Jr., M.D.

Associate in Ophthalmology, Medical College of Virginia, Richmond, Virginia

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